Skyways

Flight Operations • Business Commercial Military

MARCH 1956

- Heliport Planning-N.Y. Area
- 'Copters For Off-Shore Oil
- Round Table: Business and Commercial Use of Helicopters

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ndustry notes . . .

The first airline Convair Model 440 Metpolitan came off the production line a w weeks ago. With a recent order from peria, the national airline of Spain, for ve of the new twin-engine transport, 74 letropolitan's have been purchased to date. xecutive versions of the transport are vailable in addition to the airline model. AB certification of the basic configuration as been completed.

Pacific Airmotive Corp. has completed a ew instrument shop at the company's Oakand International Airport Branch. The iop, which will support Pacific Airmotive's clipse-Pioneer distributorship, is departented into five work areas which are nder humidity and temperature control, ncluding a "dust-free" zone for high-recision assemblies. Instruments covered y CAA classifications I, II, III and IV ill be overhauled in the new shop.

Steward-Davis, Inc. of Gardena, Calif., as contracted to supply Howard Aero, Inc., f San Antonio, Tex., with new Pratt & Whitney R-2800 engines for the Howard uper-Ventura. All engines to be delivered ill, during major overhaul, be modified, odernized, and brought to newly develped R-2800 specifications at the Steward-Davis shops in order to produce engines ith maximum safety and power for use in the Howard Super-Ventura executive conversion. Another contract received recently by Steward-Davis calls for classified turbojet engine research and development. The $250,000 contract involves extensive work and test of new design concepts for jet engine bearing systems, compressor components, and accessory items.

■ Republic Aviation Corp. announced recently the sale of all rights to the *Seebee* light amphibian aircraft to J. K. Downer of Saginaw, Mich., who is forming a new corporation which will continue to supply spares and service parts for the *Seebee*. Future manufacture of the aircraft is being considered by Downer.

■ Engineers of AC Spark Plug Division of General Motors are conducting a traveling clinic aimed at passing spark plug tips to the business pilot. Business and private fliers will be acquainted with the best spark plugs for specific engines and will be told how to keep plugs operating efficiently. AC established the clinic because the use of executive-type aircraft is expanding so rapidly that maintenance companies are hard-pressed for accurate spark plug and ignition-system information. Some of the cities the clinic will visit are Dallas, Fort Worth, Tulsa, Oklahoma City, Houston and San Antonio.

■ Despite record shipments during 1955, the year-end backlog for Lear, Inc., rose to $53,459,922 it was announced recently. The 1955 backlog was 41 per cent higher than the backlog for 1954. Much of the gain was attributed to expanded sales of automatic flight control and vertical gyro instruments.

■ Boeing Airplane Co. announced recently a $29,500,000 completely company-financed facilities expansion program. The expansion calls for two major building programs, one a $21 million Development Center, and the other a $8,500,000 manufacturing and office facility.

■ Northern Aircraft's first *Cruisemaster* four-place business plane is scheduled to fly about the first of June. The Alexandria, Minn., company purchased all production and sales rights to the craft from its original designer and builder, Bellanca Aircraft Corp., New Castle, Del. Northern Aircraft's *Cruisemaster* will be modernized.

■ An aircraft financial responsibility act recently became effective in Massachusetts. In event of an accident resulting in damage, injuries or death, the aircraft owner or pilot will be grounded until the case is settled, unless he is fully insured or financially covered.

MARCH, 1956

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WASHINGTON REPORT

by Albert D. Hughes

USAF To Leave Civil Airports

General Earl E. Partridge, Commander of the Continental Air Defense Command, USAF, told an assembly of some 1500 attendants at the recent Jet Age Conference of the Air Force Association in Washington, D. C., that the USAF is determined to remove all military flying from civil airports as soon as possible.

Although this is good news to many operators of business and private aircraft who have complained of "rough going" on civil airports used jointly with the military services, the end of military "occupation" is still not in sight.

According to **Partridge,** relocation of the military hinges on the Air Force's ability to pay an estimated cost of $3 billion to carry out this program. Since World War II, the Air Force already has spent over $7 billion constructing air bases throughout the world.

"The day is not far off," **Partridge** declared, when the Air Force will have atomic weapons stored at various air bases and on planes in flight. "Even with all safety factors we can understand the uneasiness of civilian pilots taxiing around where we have armed fighters."

On the subject of air traffic control, **Partridge** pointed out that the Air Force is of the opinion that the present CAA air traffic control system is "completely outmoded." He declared that the nation needs "an air traffic control system capable not only of riding herd on military jets, but jet civilian aircraft." Such herding must, he added, "take them off the ground, up to altitude, down to their destination and into the final approach without ever letting go."

It is evident that the General is visualizing an automatic system of air traffic control which takes over the manual control of aircraft and relegates the pilot to strictly flight monitoring.

Special D. C. Air Traffic Rules

The special rules which apply to the Washington, D. C. high density air traffic zone have been in effect since August 1, 1955. NBAA, as a member of the group evaluating the effect of these rules, has noticed several practices under the rules which should be brought to the attention of business pilots. Adherence to the following "Do's" and "Don'ts" will improve the effectiveness of the special D.C. rules:

DO

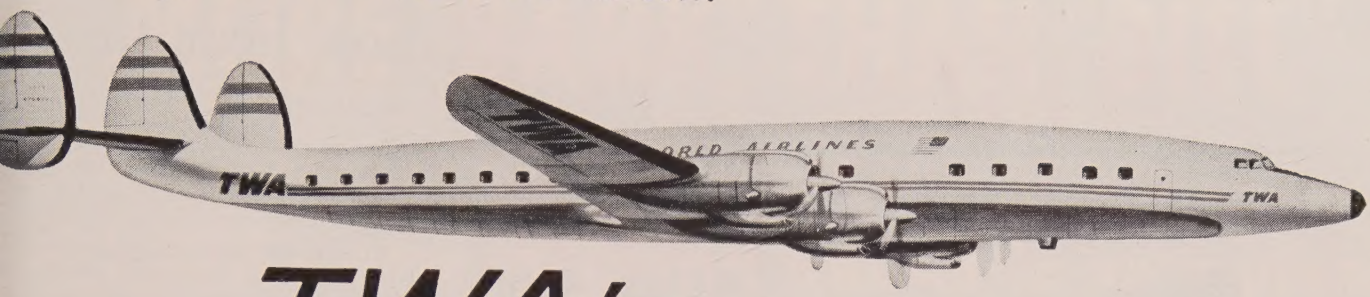
(1) Do slow down prior to entering the zone, not after entering it; (2) Do periodically check your airborne radio equipment installations to insure yourself of its satisfactory operation. It is preferable that such checks be made in the air as well as on the ground; (3) Do offer suggestions for improvement; (4) Do remain on the appropriate tower frequency while in the zone; (5) Do be ever alert to other traffic within the zone.

DON'T

(1) Don't bypass the spirit of the rules by avoiding portions of the zone in order to pass other aircraft which are slowed down in compliance with the rules; (2) Don't call the tower if you are overflying the area outside of the zone; (3) Don't call the tower until you have assured yourself that your call will not block out transmission from other aircraft or ground stations on the same frequency.

For your information, the date for the termination of Washington, D. C., high density air traffic rules has recently been extended to July 31, 1956.

DISCOVER A NEW HIGH IN AIR TRAVEL...



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PERSONNEL

James G. Byron, vice president and director of industrial relations of Curtiss-Wright Corp., has been elected to the board of directors.

W. E. Smith has been appointed to the field engineering and sales division of Aircraft Radio Corporation.

Col. Frederick A. Henry, USAFR, has been appointed executive contract officer for Fletcher Aviation Corp.

William B. Davis has been appointed by CAA as director, Office of Aviation Safety. Davis was CAA deputy regional administrator at Kansas City until last November when he was detailed to Washington as acting director of the safety office.

Ray W. Beck, supervisor of aircraft overhaul for Dallas Aero Service for the past two years, has been named production manager for the Aero Corporation, Atlanta, Ga.

Recently named to new positions with Bendix Aviation Corp. were **Richard S. Finke** as supervisor of executive aviation sales, **Charles D. Manhart** as assistant to the vice president, **George E. Beringer** as assistant general manager of aircraft products at the South Bend division, **Carlton E. Spitzer** as advertising manager of the Utica division, **Richard M. Somers** as director of engineering for the Kansas City division, **Howard K. Morgan** as director of commercial aviation systems, **Harold Wells** as chief engineer of the new aircraft hydraulics engineering group at the South Bend division and **Clarence I. Rice** as manager of the new aviation department at Bendix Radio division.

Edmund T. Price has been named chairman of the board and **Herbert Kunzel** president of Solar Aircraft Co.

John W. Myers was elected chairman of the board of Pacific Airmotive Corp. **B. Allison Gillies** was named vice chairman.

J. Grant Macdonnell has been appointed assistant to the president of Northrop Aircraft, Inc., and **Irving Roth** has been appointed staff assistant to the president.

Paul O. Momenteller was recently named commercial sales manager of Lear-Cal Division of Lear, Inc. **Tom Mitchell** was appointed Eastern regional sales manager for LearCal.

William L. Eschwei has been appointed plant manager for the Pacific Division of Federal Telephone and Radio Co., a division of IT&T. The Pacific Division manufactures aircraft equipment.

Walter G. Ewing has been named superintendent of the radio shop at Dallas Aero Service.

Harold Hynd recently was named vice-president and general manager of Douglas' Tulsa division.

Frank J. Martin has been appointed assistant sales manager of commercial aircraft sales at Aeroproducts Operations of

(*Continued on page* 47)

MORE "BARK" THAN "BITE"

in this front . . .

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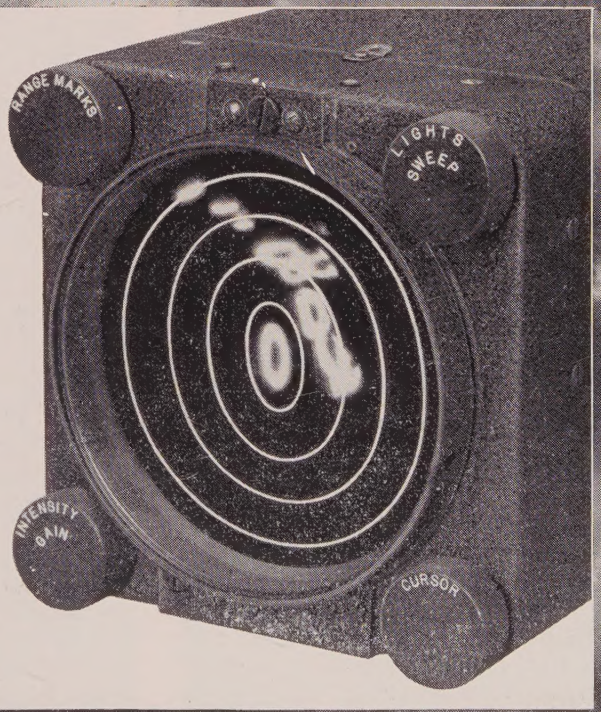
When the weather ahead looks like this, the old rule book says "go around!" But not when you have RCA's AVQ-10 Weather Radar in the business aircraft you are operating. Its scope will point out to you, night or day, or in IFR conditions, non-turbulent paths through or between storm areas that may save time-wasting, costly detours and give you and your traveling companions a smoother, more comfortable ride.

In addition to giving you this "look-see" into the weather as far as 150 miles ahead, the AVQ-10 provides detailed ground-mapping information. It is the first weather radar to use the "C-Band" (5.6 cm) frequency, ideal for storm detection and penetration. Because of its lightness, efficiency and dependability, the AVQ-10 has been specified as standard equipment by many of the world's leading air lines and by operators of business aircraft.



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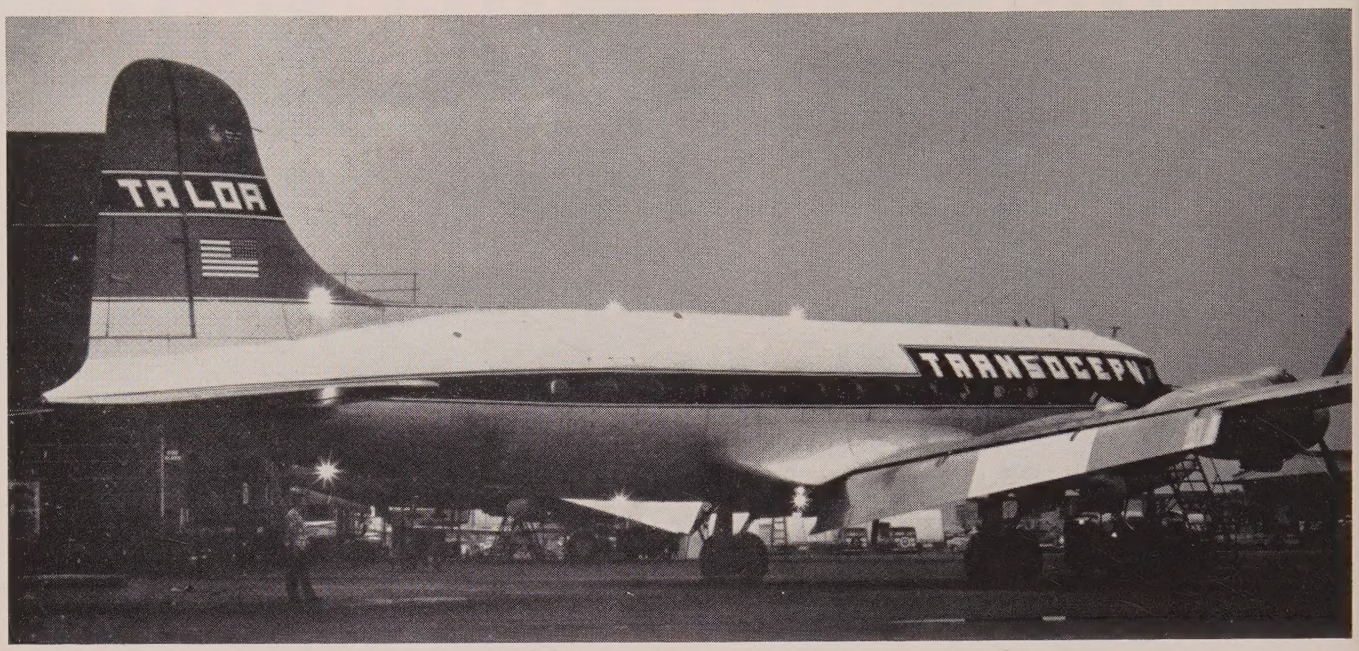


Madsen hi-intensity condenser-discharge sequential flashing lights caught in a time exposure. In actual operation the sequential blue-white flash is aft to forward once a second. The observing pilot sees a moving "pulse of light" indicating the aircraft's direction.

Hi-Intensity Aircraft Lighting

by Capt. J. G. Bush
Executive Pilot & Electronics Specialist

For many years, pilots and aircraft lighting engineers have realized that visibility as affected by atmospheric conditions is only a partial factor in the airborne traffic hazard problem. A better means of marking aircraft so as to improve early detection and recognition of direction has long been sought.

The first markings were position lights, commonly miscalled "navigation" lights. Both the method and the term stemmed from marine practice that was adequate for vessels rarely operated at speeds over 30 mph. Red, green and white lights at specific points on the aircraft served for almost three decades of flying. Slower rates of convergence as well as the lack of air-traffic congestion, allowed ample time for recognition of aircraft attitude and path by this simple, familiar method of light coding.

With the advent of World War II, traffic congestion and airspeeds took a tremendous jump. Pilots suddenly found that the steady, low-powered position lights gave insufficient warning. Near-misses became a definite matter of concern.

The simple fact that a flashing light attracts attention quicker than a steady one resulted in the first positive improvement. All air-carrier aircraft and then most civil aircraft took to automatic flashers. In many instances, additional flashing incandescent white lights were added on the top and bottom of the fuselage.

Since traffic congestion is greatest in the vicinity of large cities and metropolitan areas, the flashing position and other white lights often were found to merge with background surface lighting. (Steady ground lights seem to blink when stared at as trees, buildings and other obstructions intrude intermittently on the line of sight.) An unmistakable and instant warning of the proximity of another aircraft was required. The need resulted in the borrowing of another earth-bound device, the rotating, red, flashing beacon, used on ambulances, fire trucks and police cars.

This development, exemplified by the well-known Grimes light, was hailed as a long step forward. The results of first sightings on the airways by pilots unaware of the development were both startling and highly satisfactory. Air-carriers and many aircraft owners and operators equipped their aircraft with this light. Even light, single-engined business and private aircraft engaged in frequent night operation were soon equipped with the rotating flasher.

But prompted by the aviation industry's safety consciousness, research continued by industry, government, and private individuals. The red flasher was found to have certain deficiencies. It required that the light source be within a sector of human vision limited too closely to the straight ahead for early detection. Peripheral vision was found to be least responsive to red light; and professional pilots were aware that the most dangerous convergence angles lie within that particular area of vision. The ancient principle of the swivel-neck assumed new importance.

On too many occasions, the red flasher has required concentrated study to make sure it is an airborne safety beacon rather than a ground beacon. After detecting an aircraft's rotating beacon, it has taken vital time to track and interpret the direction of flight. During this period, the pilot's attention to other areas of responsibility has inevitably suffered. In high-density areas, this factor has become an additional traffic hazard.

A more recent attempt to solve the vexing problem has been flying the nation's airways for about a year. No

one is certain when hi-intensity condenser-discharge approach lighting was first borrowed for application to aircraft. However, it is certain that Captain Andrew Madsen, pilot and research director for Transocean Airlines, is responsible for the installations that have been made and successfully tested in long service on several aircraft, including a TAL DC-4, a UAL DC-6B, a U. S. Steel *Lodestar* and a Morrison-Knudsen DC-3. (*Ed. Note:*— It is noteworthy that corporation aircraft always are early users of equipment developed to improve the safety of flight operations.)

The detection value of a flashing light is greatly improved by the use of a condenser-discharge type of light. The blue-white flash of a wet third-rail, an overhead trolley wire, or an arc-welding operation is a good example of its attention-getting quality. Also, the pointing characteristic of the sequential flashes of this type of approach lighting indicates direction instantaneously.

Madsen employs three Xenon bulbs spaced 12 feet apart on top of the fuselage and three below. If a long dorsal fin is involved, there is usually one on either side. These bulbs afford extremely high light values in terms of weight, economy and power. The whole system weighs under 12 lbs. and consumption is less than 160 volt-amperes. Light output is 140,000 beam candle-power for each bulb, and the sequence is from aft to forward once a second. They are energized with a $\frac{1}{16}$ of a second interval between corresponding sets of bulbs. The result is an extremely conspicuous "pulse of light" indicating the aircraft's direction. Extensive studies by airport-lighting engineers have proved conclusively that the highest visibility or haze-piercing quotient of light is the bluish-white source. Old theories of the superiority of neon, yellow or red have been discarded. The blue-white brightness is so much a dominant factor in visibility that concern was expressed for the diffusion danger or glare hazard so familiar to motorists encountering bright headlights in fog conditions.

The concern was invalidated by flashing the light at less than one-thousandth of a second. Such short duration does not allow the eye reaction time, nor does it affect night vision when the light source is not viewed directly at close range.

Under solid IRF conditions it has been found that in-cloud reflection of the Madsen system is considerably less distracting than the flasher incandescent bulbs in general use.

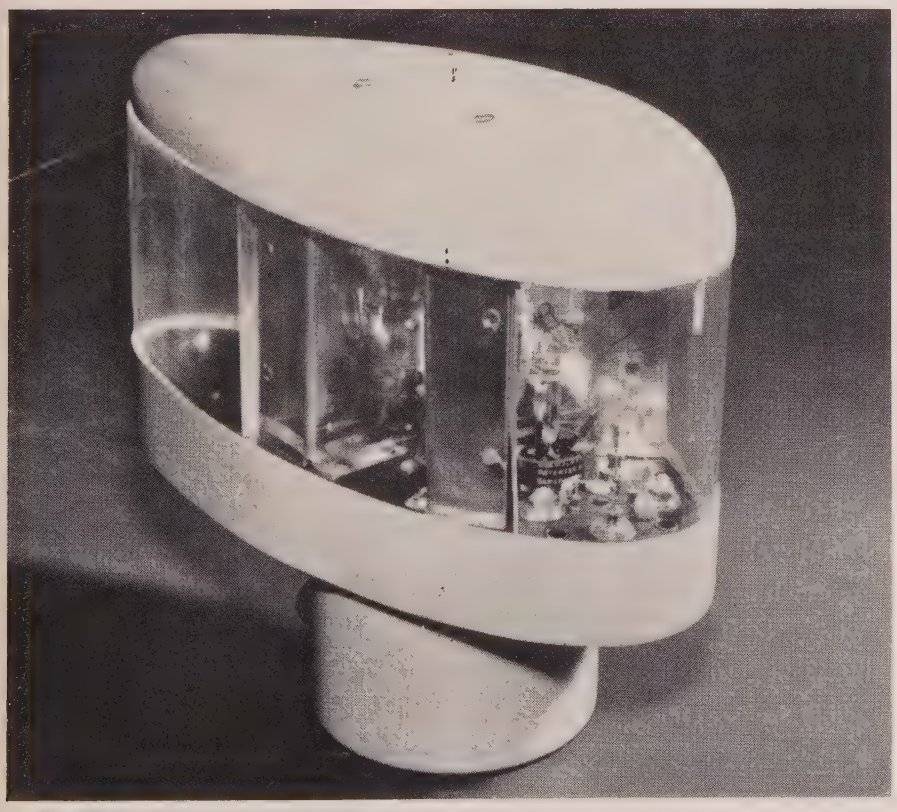
The apparent "movement" of the light source affords instant interpretation of the aircraft's direction *even at virtually head-on angles and at distances up to 20 miles*. Pilots and numerous towers have reported detection and recognition of direction at distances up to 50 miles. Sightings have been reported by United Airlines pilots at over 100 miles.

One of the greatest virtues of the Madsen system is its high detection quality in the worst kinds of traffic conditions, the marginal visibility found in heavy haze, smoke and at dusk and dawn. Clear, deep darkness provides a strong comparative background for other light systems as well as the Madsen, but the daylight obscurations that are found in high-density metropolitan areas have been of major concern to aircrew and traffic control personnel.

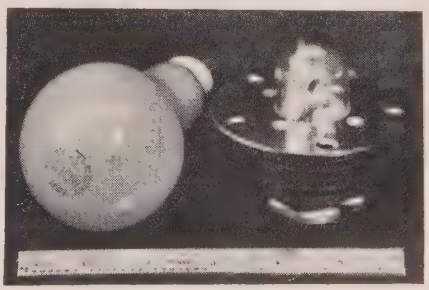
Another virtue of the Madsen system is the minute size and shape of the fixtures. The aerodynamic drag is a small fraction of that induced by conventional anti-collision lighting of the rotating beacon type. Life expectancy of the system has not been thoroughly established, although in 15 months of operation the only maintenance on the TAL installation was the replacement of a bulb fixture that received an external blow. Input power requirements currently are 115 volt AC 400 cycle. Modifying the power requirements will enable the new class of light-twins and single-engined business aircraft to employ the Madsen lights.

Another approach to the same problem is the Atkins Relative Danger light. When a pilot observes an aircraft flying in his vicinity under relatively clear daylight conditions, he automatically classifies the hazard in terms of the relative position of the other aircraft with respect to his own. If the aircraft is observed to be within a sector associated with the airspace he expects to occupy shortly, or dead ahead, he is immediately concerned as to whether he is overtaking that aircraft or whether it is coming head-on. The danger and his degree of concern are *relative* to these two factors.

Similarly, if the aircraft is observed off at one side or the other, the pilot needs to know if there is a convergence factor. Again, the danger is *relative*, if not as immediate as in the head-on condition. If the aircraft, from a position and heading that



Giving instantaneous warning relative to the heading or closing time of a conflicting aircraft, this Atkins light is the single-unit configuration for mounting atop the fuselage.



Glass part of Madsen light projects into airflow; beam candle-power output, 140,000.

bears no immediate threat, alters course so as to present suddenly a high potential danger, the pilot must be able to recognize instantly the *relative* increase and act accordingly. He must also be able to do this at night and in low visibility.

The Atkins Relative Danger light is designed to give an instantaneously recognizable warning *relative* to the heading, or closing time of a conflicting aircraft. The graphs show that with current standards of 3-mile VFR and present-day speeds, the time available to recognize the danger and do something about it varies from 18 seconds on up, depending on the relative angle of convergence. Actual tests have shown that an average pilot requires 15 seconds, from time of recognizing and evaluating the danger, to decide on a course of action, to move his controls and for the airplane to respond and start to change direction (*SKYWAYS* April '55—*Ballistics—A New Approach To Low-Approach Problems*). Hence, in an on-coming direction of from zero to 45°, the pilot only has from two to five seconds to recognize the collision danger.

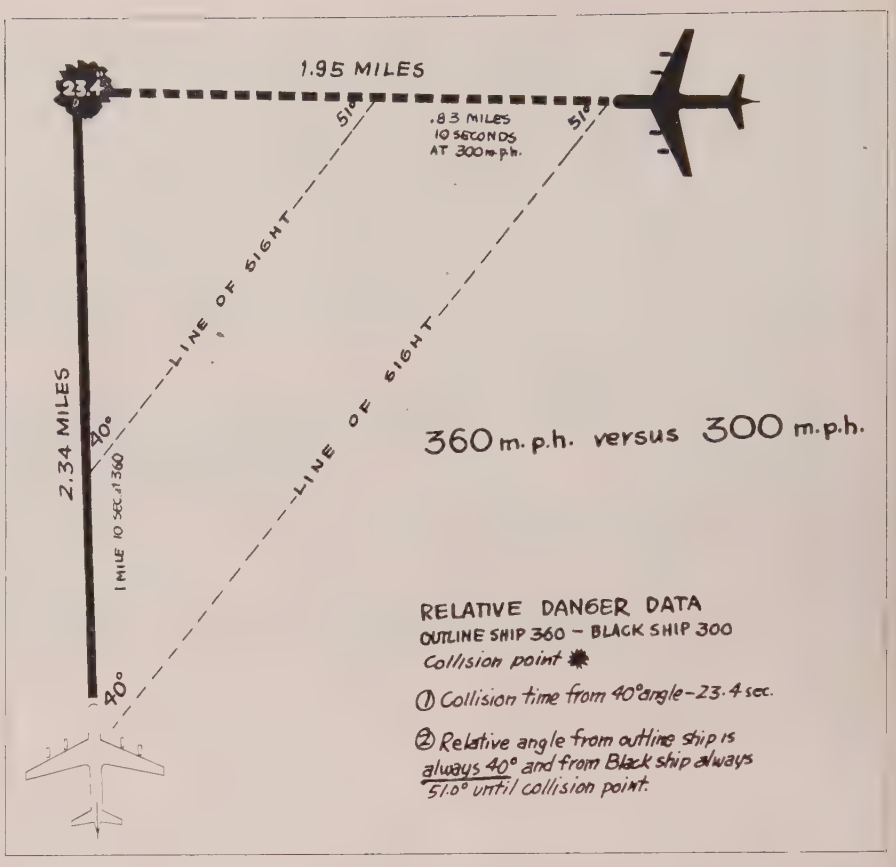
Atkins breaks up the 360° azimuth as follows: From zero to 60° either side of the nose, depending on the relative speeds of the converging aircraft at three miles range, the pilot has less than 30 seconds to make a decision and start immediate evasive action. The type of warning he receives should cause an instant reaction, even a violent one if necessary.

From 60° to 120°, or 30° directly off the wing on either side of the aircraft, Atkins estimates that at three miles the pilot has 45 to 90 seconds to recognize the relative danger and take corrective action, not necessarily violent.

From 120° to 180°, or 60° either side of the tail, is what Atkins calls the "recording" zone, or zone in which the pilot of a following aircraft can recognize the relative danger and keep track of the leading aircraft's position and movement. At the same time, a moment of inattention must not let him mistake the lights of a new oncoming aircraft for that of the aircraft he was following.

In designing his light, Atkins has built in those factors leading to a natural reaction on the part of a pilot as soon as he sees an aircraft so equipped. If on a converging course or close to it, zero to 60° on either side of the nose of the other aircraft, the pilot observes a hi-intensity condenser discharge blue-white flash blinking at him at the rate of three flashes per second. The sense of urgency is immediate and great.

If the pilot observes such a light flashing at him only once a second

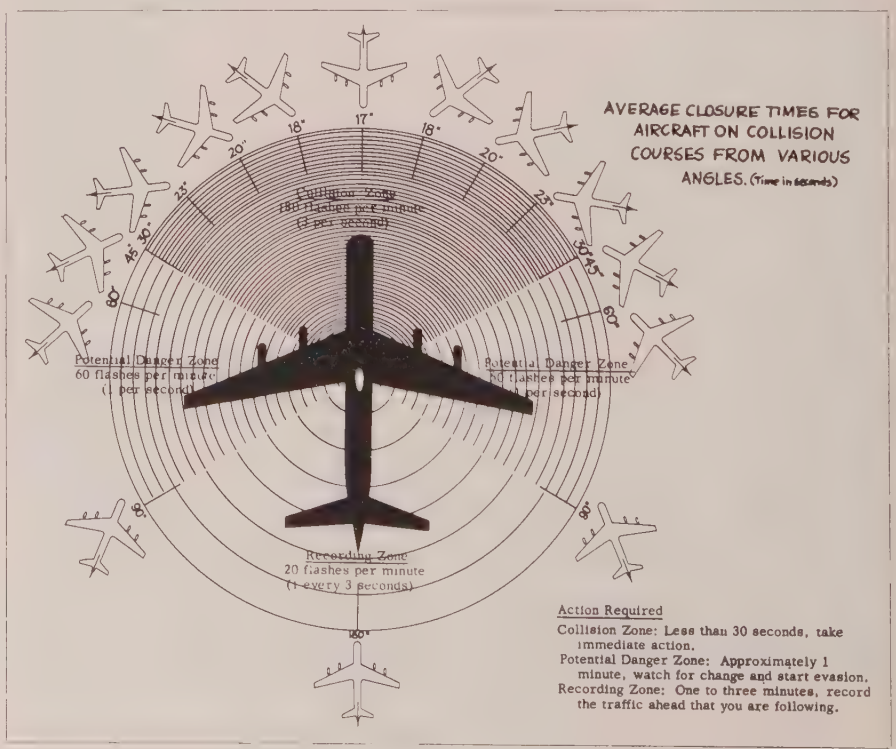


The above sketch illustrates the point that "constant breaking angle is always a collision course, regardless of varying speeds!" Aircraft collision point is 23.4 sec. away.

(the sequence timing is naturally recognizable and requires no obvious effort or counting), he knows the heading attitude of the other aircraft is either close to paralleling his own or is on a crossing course where the angle of convergence probability is much less. Although extreme caution is advisable, an immediate or violent evasive action is not indicated. The Atkins light flashes once a second toward the wing positions, or from 60° to 120°.

For the sternwise warning, 60° either side of the tail, the frequency

(*Continued on page* 39)



by Ruel McDaniel

Helicopters for Off-Shore Oil

SEAHAWK, *the Bell helicopter used to deliver personnel, equipment and supplies to oil drilling platform in Gulf of Mexico, operates off an especially built heliport*

Bill Chatterton cut his throttle and his "Seahawk" hovered awkwardly but surely 15 feet above the 50-foot diamond-shaped platform anchored miles from shore in the Gulf of Mexico. The "Seahawk" settled comfortably down to the platform, its pontoons shaking mildly and feeling their way to solid metal.

The landing was simple and uneventful. It was the fourth Bill Chatterton had made that day as routine in serving the giant $3½ million mobile drilling platform "Mr. Gus," anchored eight miles out from Padre Island, near Corpus Christi, Texas, grinding away with its drill bit 10,000 feet below the Gulf's surface.

Bill Chatterton is chief pilot for Hawk Helicopters, Inc., of Corpus Christi, organized by Sherman Kennedy, a veteran helicopter pilot, and three oil men, primarily to serve the growing list of oil-drilling rigs boring into the bowels of the earth below the surging surface of the Gulf along the Texas and Louisiana coasts.

The company presently operates three helicopters, with plans for expansion as fast as stepped-up Gulf drilling creates a demand for more.

The "Seahawk" is the all-purpose unit and takes the brunt of offshore service. She is a three-place deal with cargo baskets on each side for transportation of emergency tools, parts and even food.

Bill Chatterton's daily routine gets him out of bed before six every morning. By seven or a little later he has his instructions, his special supplies to go to the drilling rig and he's ready to take off at the temporary helicopter port some 15 miles from the drilling site. Twenty minutes later he lands on the 50-foot diamond-shaped platform built as an extension off the stern of the huge drilling rig and makes himself available for the duties of the day, and extremely varied ones, too.

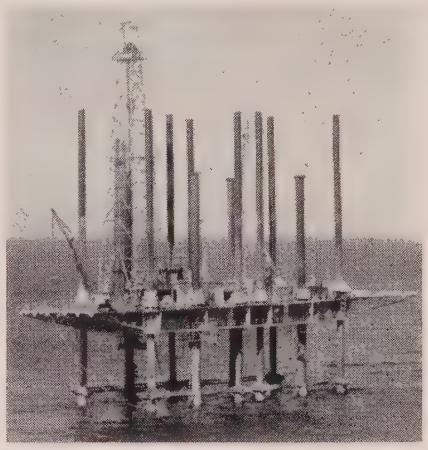
Ordinarily they're routine, but not always. Recently an accident aboard a small boat in the Gulf between the drilling rig and shore made it imperative for an injured man to be removed from the boat and rushed to a hospital. The boat was 35 feet long. Pilot Chatterton, receiving a radio call for emergency help, took off from the drilling rig and landed his "Seahawk" across the fragile stern of the 35-foot boat, removed the injured man and had him in the emergency ward at the hospital in a matter of minutes. It would have taken three hours by boat and car.

One offshore drilling rig which the Hawk organization services has a landing platform 16 feet square. Pilot Chatterton has never had any trouble landing on it or taking off from it, although a take-off in a 55-mph gale did give him a brief moment of suspense, he admits.

Another case outside of regular shuttle service routine required a special flight to a distant Gulf rig without landing facilities. The helicopter landed in the comparatively calm Gulf alongside the rig. A badly injured drilling "roughneck" was lowered to a small boat, the small boat pulled in under the blades of the helicopter and the man was eased from the boat to the helicopter and he was in the hospital in 45 minutes. It would have required four hours by any other means of transportation. Doctors said the speed in delivering the man to the hospital saved his life.

There is a logical place in offshore marine oil operations for the helicopter, because helicopters save time and time is precious.

For example, the mobile drilling platform "Mr. Gus," which is serviced wherever it operates in the Gulf by Hawk Helicopters, is on lease to a major oil company at a reported rental of $6,000 a day. That's $250 an hour. Obviously, when the speed of a helicopter can whack off even an hour's delay in getting a temporarily broken-down drilling rig back into operation, the service is an excellent investment.



GIANT *225-foot drilling platform, "Mr. Gus," is located 8 miles out in Gulf*

The versatility of the helicopter makes it particularly valuable to the offshore oil operator. One morning a drilling crewman had difficulty starting his car and did not make it to the dock and the supply boat he usually rode out to the rig. He was due to go to work at seven o'clock and a crew with one man short is handicapped. for drilling demands split-second teamwork. When a member of the team is absent. work slows down and accidents are apt to happen.

The workman had the radio office of C. G. Classcock Drilling Company, owner of the "Mr. Gus," radio to the drilling platform and ask Bill Chatterton to pick him up from a beach not

(*Continued on page* 48)

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

Business and Commercial Use of Helicopters

Panelists Forecast Most Commercial Copters Will Be Multi-engined, Turbine-powered; Operators Require—

- Larger, more economical equipment
- Multi-engine safety factor
- Low-cost, high-powered gas turbines
- Continued growth of small copter operation
- Instrumentation for IFR operation
- Special navigational aid system
- Exclusive altitudes and routes
- Revisions in ANC Manual
- Improved heliport locations

Moderator John R. Wiley (Port of New York Authority): "Gentlemen, the pace of progress in the helicopter field is best indicated by the fact that SKYWAYS held a Round Table on this subject just about two years ago. Some of you here today participated in that Round Table. So much has transpired in that short period that SKYWAYS feels a new discussion on the subject is needed. I think most of you will agree.

"We of the Port of Authority feel we know a lot more about the criteria involved in heliport design and location than we knew two years ago. I am sure those of you in the manufacturing end have a much better idea of what tomorrow's commercial helicopters will look like. I also am certain that the helicopter carriers have learned a lot in the past two years.

"Just prior to the last meeting, the Port of Authority published a report called 'Transportation by Helicopter 1955 to 1975.' I assume most of you have seen it. One of the report's interesting conclusions was that the helicopter is particularly adapted to serve the segment of common-carrier travel in this country which accounts for

Discussing present and future uses of business-commercial helicopters, Wings Club, N.Y., (L to R) G. S. Doman, Doman Helicopters; Harry Bernard, CAA; Charles Kirchner, Kaman Aircraft; C. W. Barolet, N.Y. Trap Rock; G. B. Eastburn, N.Y. Airways; John R. Wiley, N.Y. Port Authority; Tom Sullivan, N.Y. Port Authority; A. O. Pierrot, Bell Aircraft; E. G. Vanderlip, Piasecki Aircraft; D. Waters, Doman Helicopters; E. "Tug" Gustafson, Sikorsky Aircraft; F. K. MacMahon, Piasecki Helicopter Corp.

some 85 per cent of the total common-carrier intercity mileage. That is quite a market.

"Our first report dealt largely with traffic criteria, a forecast for the future and some general conclusions about helicopter operations and heliport design and location. A second report, which the Port Authority issued in September 1955, goes into more detail on the subject of 'Heliport Location and Design.' I think most of you are familiar also with that report.

"We have with us today Mr. Tom Sullivan, chief of the Aviation Planning Division, Aviation Department of the Port Authority. He also is chairman of the Heliport Subcommittee of the IATA Conference. Last February at Brussels, IATA issued a report on its second helicopter meeting that incorporated a great deal of the material in the Port Authority's report on heliport design and location. I mention these things merely as an indication of the PA's helicopter activity. As we get further into the discussion, I'm sure some of you will wish to bring your own activities up to date.

"To lead off the discussion, I would like to ask Mr. Eastburn of New York Airways to review briefly the progress his organization has made in the past two years, and also to outline what he thinks the next steps will be in terms of the commercial development of the helicopter, particularly as they will affect New York Airways' operation."

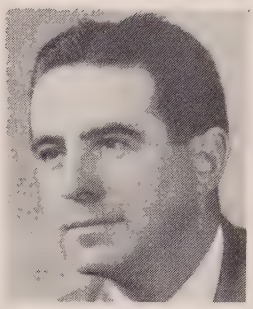
Glen B. Eastburn (New York Airways): "Since the last helicopter conference sponsored by SKYWAYS, we have extended the type of traffic we handle and have had a very satisfactory increase in volume. In fact, traffic has been offered us in such volume, particularly between Idlewild, LaGuardia and Newark, that at times we have been embarrassed by the demand for the limited space available. The traffic has been so heavy and the demand so great for passenger, express and air freight service that we have had to withdraw some of our service to suburban points in order to meet it. The increase in passenger traffic since we inaugurated it in 1953 has been tremendous. We are carrying approximately 2,500 revenue passengers a month, but the demand still is not satisfied. Air freight continues to grow and air express is increasing. At Teterboro, where we started service to meet the air express demand for Passaic and Paterson, we are adding four flights each night to meet the growing need.

"Looking ahead to the larger equipment we have ordered, we see economies. On order now are seven Sikorsky S-58's. These should be available next summer. With this equipment we will be better able to satisfy the demand for short-haul helicopter service."

John Wiley: *"With respect to the economic advantages of the new S-58's you have on order, would you care to comment on what you anticipate cost per seat-mile will be? I note that in the discussion two years ago, you were looking for something on the order of 85 to 90 miles per hour and something not too much in excess of three cents a seat-mile. Will the S-58 come anywhere near meeting either or both of those specifications?"*

Glen B. Eastburn: "It will on speed. The S-58 cruises at a little over 100 miles per hour and we should be able to increase our block-to-block time from approximately 66 to about 85 miles, which would be a very satisfactory increase. The three cents a seat-mile figure is some distance away, even with the S-58 or any presently engineered helicopter. In our most used service our charge is 56 cents a seat-mile, and we have a greater demand than we can meet. Therefore, the seat-mile cost in the short-haul is not a good measure of the service the helicopter is providing. What we are selling is time. We believe the S-58 is a long step in that direction."

ROUND TABLE PARTICIPANTS



JOHN R. WILEY is director of aviation, Port of N. Y. Authority. Before and after WW II, in which he served as Lt. Col. with ATC, he was with American Airlines. Joined the Port Authority in '50. Graduated MIT in '33 with B.S. in aeronautical engineering.

FRANK K. MacMAHON, in aviation since '34, holds com'l fixed-wing and helicopter licenses. After separation from Air Force in '46 as Col., he served as consulting engineer to Mass. Aeronautics Comm. He is military liaison administrator for Piasecki Helicopter Corp.

HARRY BERNARD, an ATR pilot for 15 years and a rated helicopter pilot, flew with Pan American and United. He joined CAA as aviation safety agent in '47; presently is agent-in-charge of N. Y. Airways and United in Region I. Flew with Navy in WW II and Korean War.

DONALD WATERS graduated from U. of Alberta in '37 and Harvard Business School in '48; is a registered engineer in N. Y. and Ohio. He left Kaiser Metal Products, where he was general manager, in Oct. '54 to join Doman Helicopters Inc. as president and a director.

GLEN B. EASTBURN served with Los Angeles Airways, the first commercial scheduled helicopter service, before joining New York Airways in 1949. He is assistant to the president of New York Airways, Inc., and also is director of traffic and route development.

C. W. BAROLET, flying since '37, became helicopter pilot for New York Trap Rock July '55. During WW II he was a basic instructor and flew P-38's with the 43rd Fighter Squadron. Before joining New York Trap Rock, he was chief pilot for New England Helicopter Service.

GLIDDEN S. DOMAN received his aeronautical engineering degree from U. of Michigan in '42; worked on helicopters for Sikorsky during WW II. In 1945 he founded Doman Helicopters; served as president until 1954. He now is board chairman and vice president-engineering.

THOMAS M. SULLIVAN joined N. Y. Port Authority in '47 as assistant airport engineer; is now chief, aviation planning division. He also is chairman of IATA's subcommittee on heliports. After graduating Oklahoma A&M in '35, he joined TWA as a project engineer.

CHARLES KIRCHNER has been in aviation since joining Pratt & Whitney in 1930 following graduation from Boeing School of Aeronautics. He joined Kaman in 1947 as public relations and advertising director; presently is assistant to president and assistant secretary.

E. "TUG" GUSTAFSON pioneered the use of helicopters in oil and mining survey work; is an internationally recognized authority on commercial helicopter operation. He is supervisor of commercial sales of Sikorsky Aircraft division of United Aircraft Corporation.

A. OGDEN PIERROT has been export consultant to Bell Aircraft Corp. since 1952, when he retired from the U. S. Foreign Service. From 1934 to 1941 he operated a sales office in Buenos Aires for Martin, Grumman, Curtiss-Wright, Fairchild and other manufacturers.

EDWARD G. VANDERLIP, treasurer and director special projects of Piasecki Aircraft Corp. since July '55, was patent administrator and automatic flight development chief for Piasecki Helicopter Corp., '46 to '55. During WW II he was with John Hopkins U. Physics Lab.

John Wiley: *"Tug, what progress have you made at Sikorsky in designing helicopters to accommodate the growth Mr. Eastburn is talking about?"*

E. Tug Gustafson (Sikorsky Aircraft): "You can break that down into many categories, but probably the primary ones to be considered are: 1) performance of the aircraft which has a great deal to do with heliport design, and 2) the size of the cabin which governs the number of seats put into the aircraft. Considering these as the two fundamentals, I would say that in the last two years we have been able to accomplish improvements and increases in both. We have gone from six and seven passengers to a minimum of 12. We have been able to increase performance so that heliport requirements in take-off areas will be at least equal to that required for the smaller S-55, and may even prove to be less. In short, even though we have approximately doubled the passenger payload and, therefore, are able to carry more passengers for less cost per mile or per ton-mile, we have not found it necessary to extend the size of the heliport currently required for S-55 operations. I'd say we are progressing in the right direction."

John Wiley: *"In other words, you are approaching the twin objectives of increased capacity without concurrently increasing the performance requirements so as to need larger heliports."*

E. Tug Gustafson: "That is right. And it is in direct contrast to the formula for fixed-wing aircraft. As you know, the more you add to the gross of your fixed-wing airplane—to put more passengers into it—the more you have to extend the length of the airport runways. With the helicopter we are increasing our gross weights, but we are not increasing the size of the heliport."

John Wiley: *"Mr. Vanderlip, may I ask you to reply to my question from the point of view of Piasecki Aircraft?"*

Edward Vanderlip (Piasecki Aircraft): "Ours is a new company, founded by the founders of Piasecki Helicopter Corporation. We have just opened our main offices and plant on Island Road, International Airport, Philadelphia. We are doing intensive research in VTOL and in other configurations. Several interesting proposals are under consideration at Washington and elsewhere. I can assure you they are interesting, but that's as much as I can reveal at this Round Table."

John Wiley: *"Frank MacMahon, would you like to comment on the point of view of Piasecki Helicopter Corporation?"*

Frank K. MacMahon (Piasecki Helicopter Corp.): "If I may, I'd like to mention two accomplishments that have been achieved since the last SKYWAYS Round Table discussion. Two years ago we definitely were not competitive with the industry from the cost point of view. Today, we feel we have made such progress in that direction that we are truly competitive. Production-wise, the organization is running much more smoothly and deliveries are being made on schedule. In addition, the past two years have seen the accumulation of a tremendous number of operating hours on our helicopters under all types of conditions. As a result of this service experience, we have learned a great deal and have been able to greatly improve the operating characteristics of our product."

John Wiley: *"Have you done any work specifically in tailoring your product, which at this point is largely for military use, to meet the future needs of the commercial operators?"*

Frank K. MacMahon: "The requirements of commercial operators are given careful consideration in every change we make in the product we are delivering to the military customer. Whenever changes are introduced in the military helicopter, we attempt to accomplish them in a manner which will improve the commercial usefulness of the aircraft if this is possible without compromising its military utility. To answer your question more specifically, we have come to the conclusion after talking with most of the operators of helicopters in scheduled passenger service that they really require multi-engine equipment. They have indicated that they consider any single-engine helicopter purchased today as merely interim equipment to be replaced as soon as multi-engine aircraft become available. For this reason, we are concentrating our efforts on expediting the development of multi-turbine equipment to meet the reliability criteria which the operators of scheduled passenger service require today."

John Wiley: *"Mr. Doman, would you care to comment on the applicability of your company's work toward commercial or eventual commercial operation?"*

Glidden S. Doman (Doman Helicopters, Inc.): "Going back to Mr. Gustafson's comments, we have been well aware of and are convinced that in this business we are selling convenience and time rather than miles. With

(*Continued on page* 34)

"In this business," explains Glidden S. Doman (left), "we are convinced that we are selling convenience and time rather than miles. With that in mind, we have de-emphasized speed somewhat."

"So much has transpired," says John R. Wiley (center), "since SKYWAYS held its last Round Table on this subject two years ago that we believe this new discussion is needed. I think you all agree.

HELIPORT PLANNING in the New York Area

by John R. Wiley

Director of Aviation, The Port of New York Authority

The Port of New York Authority has a long-standing and double-barrelled interest in helicopters.

Our interest in this new vehicle as a means of transportation for our own personnel led us to acquire a used Bell 47D in May 1951 for operation from a heliport atop our 16-story Port Authority Building in lower Manhattan. Two years later we replaced it with two new Bell 47G's. The manner in which we use our helicopters was explained in the July 1954 issue of SKYWAYS in Herb Fisher's article, "Operation of Executive 'Copters."

However, our interest in helicopters for transportation of our own personnel is secondary to our interest in them as the bi-state agency responsible for airport and heliport planning and operation in the New Jersey-New York metropolitan area. In keeping with this responsibility, we have been studying the potential of the helicopter and its operational characteristics, both present and future, as a basis for determining the requirements for helicopter landing areas. As a result of these studies, we have been ready for almost two years to provide a temporary heliport in midtown Manhattan which would enable New York Airways to develop experience and operating information which would act as a guide to the construction of a permanent Manhattan heliport.

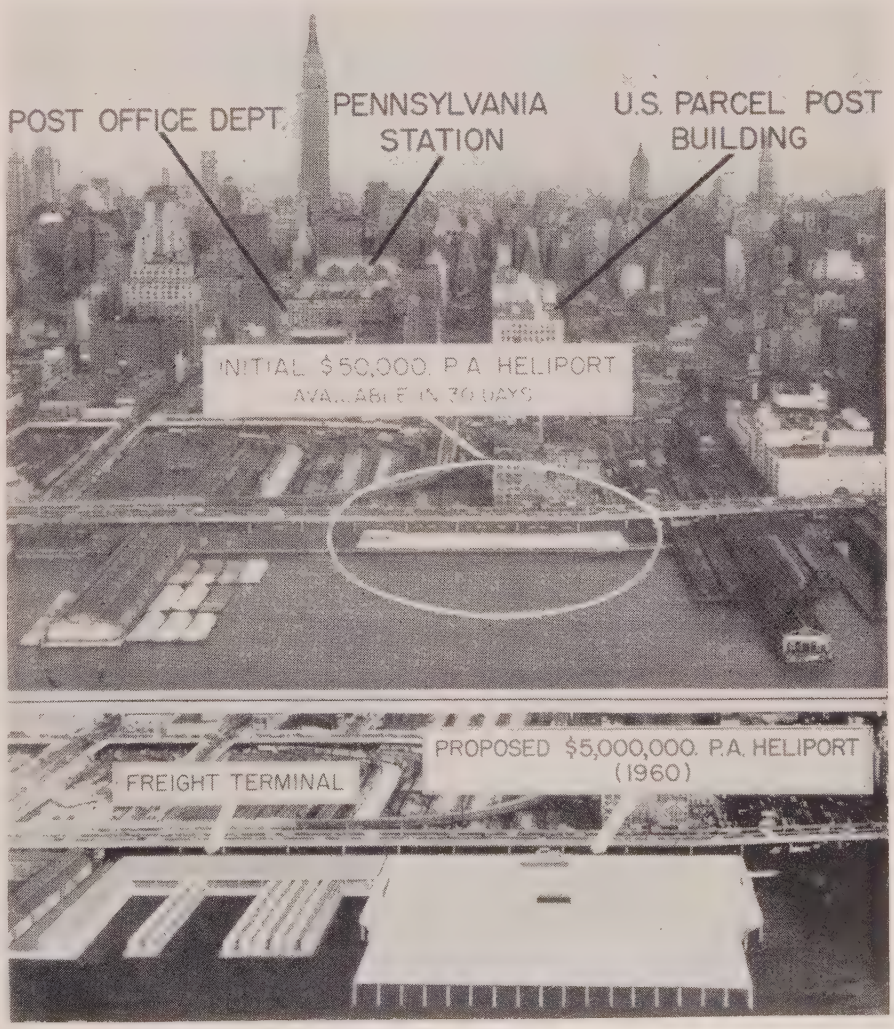
On August 23, 1955, the Port Authority publicly requested the City of New York to issue a permit for a 100-by-400 foot temporary heliport, to cost $50,000, at the foot of West 30th Street. Upon obtaining such a permit, we would build within 30 days a heliport capable of handling commercial helicopter service for the next three to five years. Following development of the necessary experience and criteria, the Port Authority would go ahead with the construction of the permanent facility.

Since then, controversy has prevented the construction of this temporary heliport. We hope that it will be resolved shortly and that the heliport will actually be in operation this year.

C. J. Lowen, Administrator of Civil Aeronautics, indicated in a letter and report received on January 31 that the Civil Aeronautics Administration has concluded that:

"A safe and reasonably regular passenger operation can be conducted at the bulkhead 30th Street heliport with New York Airways S-55 helicopters equipped with the pneumatic flotatioi gear which the operator plans to use. We do not believe that a

(*Continued on page* 39)



SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business

Pikes Peak receives its first flying machine. Cessna's CH-1 all-metal helicopter, piloted by Jack Zimmerman, landed and completed hovering tests atop the 14,100 ft. peak in Sept. '55. The CH-1, powered by a 260 hp engine, took off and hovered with three persons on board.

Cessna's CH-1 Helicopter Gives Outstanding Performance

Wichita, Kan. First flown in July 1954, Cessna's CH-1 helicopter has established outstanding performance records in subsequent tests, and is a potential strong contender in the military and small business helicopter market. On September 13, 1955, it successfully hovered above Pikes Peak, an official 14,110 feet, with three persons aboard.

An all-metal machine with a single main lifting rotor and a conventional tail rotor, it is powered by a Continental FSO-470-A engine, delivering a net 260 hp to the transmission. The CH-1 has a speed of 122 mph at sea level. At 5,000 feet, it will offer a true air speed of 110 mph, and at 10,000 feet, a true air speed of 96 mph. These speeds are obtained without narrowing the engine RPM range with altitude. The full 200 RPM range is available at all altitudes.

Using only three gears in the main transmission and two in the tail rotor assembly, plus Cessna's angle blade attaching member, the CH-1 should provide greater service with less maintenance. Locating the supercharged engine in the forward fuselage makes greater cargo and passenger space available near the center of gravity.

Based on the normal fuel capacity of 60 gals., the CH-1 weighing 2,600 lbs. has a range at cruising speed of 290 miles; at maximum gross weight of 3,000 lbs., it has a range at cruising speed of 270 miles.

New Super Widgeon Conversion Delivered to Reading Aviation

Portland, Ore. The first all new McKinnon-Hickman *Super Widgeon* recently was delivered to Reading Aviation. More of these conversions are on the production line.

The airframes, built in France under license to Grumman, are the same as the American G-44A *Widgeon*. Welsh Aviation Co. purchased them and shipped them to McKinnon-Hickman Co. for conversion to the *Super Widgeon*. All electrical wiring, hydraulic lines and instruments are stripped from the airframes. The new instrument panel allows for a blind flight group, all engine and operational instruments, and has room for the installation of ADF, Omni and three radios. The new electrical system is 24-volt with all switches and circuit breakers mounted overhead on the pilot's side. Wings and flaps are covered with metal and extra tanks are installed in the outboard wing panels, making total gas capacity 154 gals. instead of the standard 108 gals. in the *Widgeon*. Modifications to landing gear and hull boost the land or water gross weight to 5,500 lbs. Either 270 hp or 295 hp Lycoming engines with the Hartzell three-bladed propeller are used.

Performance specifications for the all new *Super Widgeon* are:

Take-off run sea level, gross wt.	600 ft.
Take-off glassy water, gross wt.	10 sec.
Rate of climb sea level	1750 ft./min.
Climb to 10,000 ft.	10 min.
Cruising speed	
sea level (75% power)	170 mph
sea level (65% power)	160 mph
10,000 ft. (62½% power)	170 mph
Maximum speed sea level	185 mph
Service ceiling	18,000 ft
Landing speed	62 mph
Single engine ceiling	5,000 ft
Approx. range (30 min. reserve)	1,000 mi.
Empty wt. less radio	3,825 lbs.
Gross weight	5,500 lbs.

The price of the *Super Widgeon* flyaway Portland, Ore., less radio, is $70,000.

Business Aircraft Set Production and Use Records

Washington, D.C. Marked increases in both production and use of single and multi-engined utility aircraft for business, industry and agriculture during 1955 was re-

All-new McKinnon-Hickman Super Widgeon conversion uses G-44A Widgeon airframes built in France under license to Grumman. Repowered and re-equipped, gross weight is 5,500 lbs.

ported recently by Joseph T. Geuting, Jr., manager of the Utility Airplane Council of the Aircraft Industries Association.

Official shipment figures for the year showed that 4,434 utility airplanes with a retail value of approximately $91,000,000 were delivered. These figures represent a 44 per cent increase in units and a 57 per cent increase in dollars.

"Of particular significance is the fact that utility airplane manufacturers delivered 808 twin-engined aircraft seating from four to nine passengers, more than doubling 1954 deliveries of 354 aircraft of this type," Geuting said.

AIA figures indicated that during 1955 general aviation flew an estimated 9,500,000 hours—an increase of 537,000 hours over 1954. Most of this increase, 425,000 hours, was recorded by business flying which compiled a record total of 4,300,000 hours.

Geuting said that America's business fleet last year logged an estimated million more hours than the nation's domestic airlines, despite the fact that 1955 saw an all time record for airline hours flown.

Steward Air Park Opens Howard Johnson Restaurant

Parkersburg, W. Va. Steward Air Park officials announced recently that a new $150,000 Howard Johnson's restaurant has been completed and is ready to serve the flying public. In addition to the new restaurant, complete hangar and service facilities and a 15 room air-conditioned Sky Motel are in operation at the air park. B. D. "Bun" DeWeese has been placed in charge of air park facilities.

Two Oil Companies Order Convair's 440

Cities Service Oil Co. and Union Producing Co. are announced purchasers of the executive version of Convair Division of General Dynamics Corp.'s Model 440 Metropolitan twin-engine transport. The names of two other business purchases of the executive version have not been released. With a recent order from Iberia, Spain's national airline, for five, 74 Metropolitan's have been ordered since production was announced last August.

New Distributors Named

Wallace Aircraft Co., Inc., of Sarasota, Fla., and Carolina Aircraft Sales, Charlotte, N.C., have been named by Lear, Inc., as distributors of radio navigation and communication equipment, gyro instruments, automatic pilots and flight control systems and accessories.

Four new distributors of the Camair 480 twin-engine executive aircraft named recently by Camair are Latin American Aviation, Mexico City; Paul S. Bailey Enterprises, Inc., Phoenix, Ariz.; The Soctaw Corp., Syracuse, N.Y., and Southern Ohio Aviation Sales Co., Dayton, O.

Pacific Airmotive Corp. recently signed a sales and service agreement naming it distributor for the Rocky Mountain area for Scintilla Division of Bendix Aircraft Corp.

. . . . in the business hangar

Robert J. Kusse, chief pilot and NBAA representative for Fruehauf Trailer Co., flew his company's *Ventura* to Horton & Horton Custom Works, Dallas, Tex., for a special interior. In the near future, H&H will provide a custom interior for a Bell model 47H helicopter to be delivered to Fruehauf.

Northwestern Aeronautical Co., St. Paul, Minn., recently made a Jato installation on Line Material's DC-3. Ray Routley and Bill Hampel flew the DC-3 in from Milwaukee.

Spartan Aviation Service of Tulsa, Okla., recently installed five hydraulic rudder assist systems, engineered and manufactured by Spartan, on Lockheed PV-1 *Venturas* owned by Kraft Foods Co., M. A. Hanna Co., Dresser Industries, Standard Oil of Indiana, and Champion Paper and Fibre Co.

Ray Swider and Mel Cruder accepted their General Tire and Rubber Co. Douglas B-23 N1G from Chamberlain Aviation, Inc., Akron, O., following installation of Pioneer PB10A autopilot with radio beam coupler, Bendix RDR-1 radar, complete re-instrumentation, fire control and aircraft wiring.

West Texas Utilities' B50 *Bonanza* was brought to Southwest Airmotive Co., Dallas, by Russell Crownover for a double engine change.

A new accessory overhaul shop has been opened at Atlanta, Ga., by Airwork Corp. of Millville, N. J. It will offer warrented overhaul, repair and adjustment of most engine driven accessories in current use.

Van's Air Service, Inc., have moved the major portion of their operations from Winona to St. Cloud, Minn. A new shop large enough to accommodate two DC-3's at one time is being constructed at Winona Municipal Airport.

Jim Hickerson brought Plymouth Oil Co.'s *Lodestar* to Lear Aircraft in Santa Monica, Calif., for a *Learstar* Mark II conversion, the first *Lodestar* to receive the conversion. NBAA representative and chief pilot for Plymouth is Stanley N. Siggins.

Robert Sliker, chief pilot for Scripps-Howard, had Collins 51R3 Omni and Collins 51V2 glide slope installed in the company's B23 at Remmert-Werner in St. Louis.

Reserve Mining's DC-3 was brought recently from it home base at Cleveland, O., to Northwestern Aeronautical Co., St. Paul, Minn., for an engine change, 100 hour inspection, and miscellaneous repairs. Pilots were Charles Glaze and Ken Brown. Everett Dyer is Reserve Mining's NBAA representative.

Ray Hodge of Odessa Natural Gasoline Co., Odessa, Tex., brought the company's *Lodestar* to Executive Aircraft Service, Inc., Dallas, for 100 hour inspection and miscellaneous repairs.

Hydraulic Press Manufacturing Co. of Mt. Gilead, O., recently had its D18S Beechcraft into Roscoe Turner Aeronautical Corp., Indianapolis, for the installation of a Wilcox 440 communication system. Warren Gray was the pilot.

John Frank flew Schwitzer Corp.'s Grumman *Widgeon* G-44A into Mattituck Airbase, Linden, N. J., for the McKinnon-Hickman conversion to Lycoming 270 hp engines and three-bladed propellers, metalized wings, exterior paint and overhaul and relicensing. Home base for the *Widgeon* is Indianapolis.

Orville E. Sparks, chief pilot and NBAA representative for Holley Carburetor Co. of Detroit left Southwest Airmotive Co., Dallas, recently in the company's DC-3 following heavy gear installation, major modifications, annual inspection and installation of Jato assist.

Lear Aircraft Engineering Division, Santa Monica, completed a 100 hour inspection on one of U.S. Steel Corp.'s *Learstars*. Don Teel, chief pilot and NBAA representative for U.S. Steel, and Bill Collister, co-pilot, flew the *Learstar* from Santa Monica to New York non-stop to resume service.

Howard Riddle, chief pilot for Sundstrand Machine Tool Co., recently brought the firm's two D18S's to Remmert-Werner, St. Louis, for interior rework. Riddle is Sundstrand's NBAA representative.

George Healy and Don Swift were at Northwestern Aeronautical Co. in St. Paul for relicensing and an engine change of the Cleveland Cliffs Iron Co.'s *Lodestar*.

Executive Aircraft Service, Inc., handled an airframe overhaul, new exterior paint job, and miscellaneous installations and repairs for Imperial Oil Air Transport, Ltd.'s Lockheed *Lodestar*. Bruce Middleton flew the plane to Dallas.

National Literary Association of Terre Haute, Ind., recently had a Lear Arcon installed in their *Bonanza* at the Roscoe Turner Aeronautical Corp. hangar in Indianapolis.

Groveton Papers Co. of N. H. had their Grumman *Widgeon* at Win Air Service, Hancock Field, Syracuse, N. Y., for the McKinnon-Hickman conversion.

Pilot Doug McLain and co-pilot Lester Easley of Williamson & Dickey brought the company's PV-1 into Southwest Airmotive Co., Dallas, for a double engine change.

Burroughs Corp.'s *Learstar* was modified recently by Lear Aircraft for a gross weight increase to 24,000 lbs. Pilots Don MacDonald and Bernie Covington brought the plane to Santa Monica, Calif.

Bill Tyler brought Westinghouse's DC-3 to Remmert-Werner in St. Louis for repainting of the exterior and recovering of control surfaces. A. C. Korb is NBAA representative for Westinghouse.

Official NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at Pennsylvania Building, Suite 344, 13th & Pennsylvania Avenue, N.W., Washington 4, D.C. Phone: National 8-0804.

Boggess Calls For New Approach To Air Traffic Control Problem

NBAA's President, Henry W. Boggess, speaking before the recent Air Force Association Jet Age Conference, said that the U. S. seems to be planning to enter the Jet Age depending on radar controlled from the ground to handle air traffic. He pointed out that the time will come when this method would prove inadequate.

He went on to say, "I am willing to assume that it may be necessary to control landings and takeoffs from the ground through the foreseeable future." But, he asked, "Should it always be necessary to control altitude level flight from a point on the bottom of the air ocean?"

Boggess believed that the proper approach might be to think in terms of airspace rather than airways. "After all, true utility of the air ocean dictates direct routing—the shortest distance between takeoff and landing."

He suggested the invention of an airborne electronic box that would assure direct and individual enroute clearance under IFR conditions which would be infinitely safer than present VFR flights. Such a device, he stated, "could conceivably give a pilot 'eyes' for perfect IFR vision and even eliminate the traditional VFR blind spots from above, to the rear and below."

In addition, it would also display pips so that speed, direction, altitude and distance-away could be accurately known instead of guessed and misjudged, as frequently happens when dependence is placed on the VFR human eye.

At present, Boggess declared, many tools that could help solve today's air traffic control problems are going unused. Offering VOR/DME as an example, he added, "No time should be wasted in waiting to see how TACAN or something else will replace VOR/DME. If TACAN does not, then something will eventually. Such is the price of progress."

But, he concluded, since VOR/DME is here now and usable and provides more accuracy than a pilot can manually fly, it should not be ignored unless and until better navigation aids are perfected and fully ready to be placed into operation.

Continued NBAA Growth Forces Move to New Quarters

At its meeting in Washington, D. C., in January, NBAA's Board of Directors approved the moving of National Headquarters to new and larger offices. After March 1, 1956, the new address will be:
National Business Aircraft Association, Inc.
Pennsylvania Building, Suite 344
13th & Pennsylvania Avenue, N. W.
Washington 4, D. C.

Telephone numbers:
NAtional 8-0804 and NAtional 8-0805

NBAA President, Henry W. Boggess, in announcing the change of Association offices said, "The continued growth of NBAA requires enlargement of our National Headquarters facilities and expansion of our staff and services. The steady increase in our membership is positive proof to the Board that the activities of NBAA at the national level in behalf of business aircraft owners and operators is being more widely recognized and appreciated. All indications point to an even larger growth in membership during this year."

A cordial invitation is extended to business aircraft operators journeying to Washington to visit our new offices.

Mexican Aero Club Offers New Travel Service to Pilots

A complete travel and information service —everything from hotel reservations to customs aid, and including suggestion and preparation of itineraries, is now offered to pilots through the Mexican Aero Club.

Captain Alfonso Brito Orozco, travel section manager, announces that the M.A.C., through a recent agreement with America Travel, S.A., can now offer complete information on vacation flying in Mexico to all interested individuals and groups.

The following is a complete list of services now offered:

(1) Customs aid, (2) Bilingual commercial pilot-guides, (3) Suggestion and preparation of itineraries, (4) Information about airport conditions, gas and servicing of airplanes, (5) Hotel reservations throughout the country, (6) Weather and forecast reports, (7) Chartered planes of all types, (8) Guided flying tours, and (9) Ground transportation and guides to places not accessible by plane.

Those desiring complete information and rates may write: America Travel S.A., Capt. Alfonso Brito Orozco, Travel Section Mgr., Mexican Aero Club, Madrid 69-33, Mexico, D.F.

New ATC Developments Must Pass Three CAA Tests

According to the CAA, every major new development in the field of air navigation and air traffic control must pass three tests: (1) It must check out as safe and reliable. The CAA bears a primary responsibility on this score, which comes ahead of the sincere desire to accommodate a higher volume of traffic at a faster rate, (2) It must be acceptable to all major user groups. The Federal Airways are public highways, set up to serve both airlines and business planes, military and private aircraft. General agreement must be obtained from users to equip their planes to receive the signals of any devices installed on the ground, (3) It must show a reasonable relationship between cost and ultimate benefit, in light of the demands made from all sides on the Federal Treasury.

Keeping in mind these three essential tests, we can readily see why air navigation and traffic control improvements will never be made as fast as we would like.

Static Charge on Craft Causes Lightning Strike

The following unusual report was forwarded to National Headquarters by an NBAA member. It deserves careful reading.

"On a flight December 17, 1955, en route to New Orleans from Winston-Salem, N. C., our Douglas A-26 plane was hit by lightning 40 miles northeast of Evergreen Omni station.

"We were flying IFR 12,000 feet and were encountering light snow. It was 1700 E.S.T. and still fairly light. We noticed it was getting dark entering a cloud formation. All at once there was a terrific explosion as if our heater had blown up. We immediately cut the heater off and encountered severe turbulence for approximately 4 to 5 minutes. The flash momentarily stunned us, and we were taken quite by surprise since we had seen no sign of lightning previously or afterwards.

"After landing at New Orleans and inspecting the aircraft, the following was found:

The lightning hit a propeller blade, right engine, about 10 inches from tip and melted blade about ⅛ inch deep, 4 inches long, then bounced to the side of fuselage. Our cockpit fresh-air inlet scoop is located where the lightning hit the fuselage and it traveled up in the cockpit via the fresh-air tubing and there were flash burning smoke marks around the vent outlets. It traveled back along the side of fuselage, then to the bottom side of wing 12 inches from fuselage, leaving burned marks at skin drain holes and rivets which were appar-

ently loose. At the trailing edge of the landing flaps it looked fused as if it were trying to discharge. From there it traveled down and back along the bottom right side of fuselage to the tail. Along the fuselage it burned several rivets, half melted three screws, and burned one hole 5/16 inch in diameter. The lightning traveled up the fin and discharged at the top rearward point, burning a hole in the metal about the size of a dime. When it discharged, it flashed back on the rudder, burning the paint and dope off nearly to the fabric, although it did not damage the fabric. The only repair necessary was to sand off top of rudder and re-dope.

"Our theory on the incident is that our plane built up a static charge from our speed (320 true) and the snow. We contacted a cloud of an opposite charge which made the lightning. Had there been any leaking fuel tanks or gas fumes present in right wing or fuselage, undoubtedly there would have been an explosion causing considerable damage."

Braking and Stopping Aircraft Depends on Handling Technique

The National Advisory Committee for Aeronautics (NACA) has recently circulated the following information pertinent to braking and stopping an aircraft.

"The technique of handling the airplane determines the extent to which the capacity of the wheel brakes can be utilized. Raising the elevators immediately after the nose wheel touches the ground may reduce the stopping distances by as much as 10 per cent on wet concrete runways and on icy surfaces. Instant flap retraction on ground contact may give an additional reduction in stopping distances of about 25 per cent on a dry concrete runway, and of 30 per cent on a wet concrete runway. Flap retraction on icy surfaces would yield little or no reduction in stopping distances beyond that obtained with the raised elevators."

Reaction to Accident is Something to Think About

Recently the city council of Los Angeles petitioned the CAA to prohibit single engined aircraft from flying over the city of Los Angeles at night. This action was taken only a few short hours after a single-engine aircraft had crashed into an apartment house in a suburban Los Angeles section the night before. The crash resulted in the death of the pilot and several tenants of the apartment building. Such action would certainly preclude the possibility of a re-occurrence of such a disaster but this would be accomplished at the expense of all general aviation, specifically business and pleasure flying in the Los Angeles area. The California Aeronautics Commission has taken action vigorously opposing the proposal of the Los Angeles city council. The commission offers instead an endorsement or amendment to existing regulations which would in effect tighten existing flying regulations and provide a more thorough screening of applicants for pilot certificates.

The accident investigation revealed that the pilot involved in this tragic accident had a record of ninety arrests for highway traffic violations, 36 of which were for speeding, 6 reportable automobile accidents during the previous twelve years which resulted in one fatality in 1947 and one injury in 1951. He had been on probation for an extended period of time and at the time of his death, his California driver's license had been revoked by court action. After the driver's license in his home state had been revoked, he had subsequently obtained driver's licenses in two other states. Concerning the subject accident, in addition to the fact that he was flying at the time of the accident under instrument conditions without instrument rating, there is evidence that indicates the pilot was in no physical condition to be flying on the night of the crash. An investigation after the accident also revealed that the pilot had little or no sleep during a 36 hour period prior to the crash, a period which incidently included a party as well as routine work.

The action proposed by the city council of the city of Los Angeles does not appear to be the answer to the problem no more than the abolishment of automobile traffic at night in an effort to eliminate automobile accidents that occur at night. Certainly existing regulations governing the flight of aircraft are adequate if a pilot realizes his own limitations and the limitations of his aircraft and in doing so exercises reasonable judgment in the planning and execution of any flight. While an accident of this type is an isolated incident, the fact is very forcefully brought home to everyone that such an accident can do immeasurable harm to civil aviation.

The background of the pilot, the circumstances of the crash, the public reaction to the incident and the effect of any one or all of these factors on aviation demands our most serious consideration.

Review the entire incident . . . it definitely is . . . something to think about.

Pilots on Lookout For Rotating Red Beacon

A recent experience of a business pilot while flying at night indicated very clearly that pilot are prone to be on the look-out for the brilliant red, rotating warning light now becoming more prevalent, especially on multi-engine corporation-owned and airline aircraft. The standard red and green wing tip lights are not nearly as visible as the rotating beacon, consequently aircraft equipped with just the standard arrangement of navigational lights can come up fast on the approaching pilot before he becomes alerted to the situation. It is bad practice in any instance to *assume* that you are being seen—the possibility of night collision will become more imminent with the increase in traffic.

Survey Shows Most Firms Limit Executives in Aircraft

Recently, NBAA member Minnesota Mining and Manufacturing Co., of St. Paul, Minn., conducted a cross-section survey of policies in effect among various company owners and operators of business aircraft relative to executives traveling together in the same airplane.

A total of 12 companies, of varying size, participated in this survey. Of these 12 companies, 50 per cent had specific limitations on the number of executives allowed to travel together, 17 per cent had general limitations (such as "not too many executives") and 33 per cent had no limitations.

Among the various types of limitations in effect, three were most common:

1. A limitation as to the number of officers that may travel together.
2. A limitation as to the number of key executives per organization unit (dept., div., etc.) that may travel together.
3. A restriction against certain pairs of key executives traveling together, such as the chairman of the board and the president, a key executive and his assistant, a department head and the next man in charge, etc.

Following is a listing of the companies included in the survey with a summary of their replies:

Co.	*Type of aircraft*	*Limitations as to number of executives allowed to travel together*
A.	2 DC-3 1 D18S	None
B.	1 DC-3 1 340	2 per dept. or div. (asst. mgrs. & up) 3 officers 11 employees
C.	1 DC-3C 1 D18S	Not too many top executives
D.	2 DC-3	None
E.	1 DC-3 4 B-23	5 officers: 4 employees per div. or product dept. of whom not more than 2 may be managers.
F.	1 DC-3	None
G.	2 340 1 DC-3 3 G-73 1 D18S 4 7W17 3 NAV-4	3 non-officer directors plus 3 officer directors 3 elected officers — the chairman of the board & president do not ride together. 1 of a dept. head and the man next in charge. No company employee may ride as a passenger in a single engine aircraft of the company.
H.	2 DC-3 1 D18S	None
I.	2 DC-3	2 top people per dept. or div.
J.	1 DC3C	3 officers 3 key employees per dept. or div. Chairman of the board & president do not ride together.
K.	1 DC-3	2 in depts. of 8 employees or less. 3 in depts. of more than 8 employees.
L.	2 DC-3 4 Beechcraft	Try not to bunch key executives.

NBAA hopes you will find the foregoing information of interest and value. Appreciation is expressed to Minnesota Mining and Manufacturing Co. for making available the results of their survey.

(*Continued on page* 48)

FUELS-OILS

Features and Facts Pertinent to Successful Flight Operations

Helicopters Have Their Own Fuel and Oil Appetites

What does the wonderful whirlybird eat? Now that helicopters are becoming a more and more familiar part of the business aircraft picture—and a bright part at that—the fuel and oil demands of this type of aircraft should begin to be as familiar as the specifications of any fixed wing craft with which the executive and pilot, as well as charter operator, may be familiar.

For some, however, the 'copter's appetites may still seem a bit strange. Here are some solid samplings of what is being done and what may be done in the future to fuel and lubricate this new member of the business fleet.

First of all, of course, there is the nature of the power plant that makes the helicopter go. Because of the relatively high power settings at which the craft are operated, the engine is strictly a high-output piece of machinery.

From that fact comes the first "problem" area: plug fouling.

The solutions in that area are coming along two distinctly divided paths. First there are the advocates of the use of TCP as an additive to the regular aviation gasolines used in helicopter operations.

Also, however, there are the firm advocates of clearer fuels containing *less* lead to begin with.

As an ideal, of course, high octane fuel that gets its rating through the refining process, rather than through the addition of tetraethyl lead, is a "natural." But, as aircraft operators well know, that grade of clear fuel would cost a good deal more than most flight operation budgets could stand—business or commercial.

For the "less lead" school of thought, therefore, there may be some sort of middle-way in the blending of fuels to achieve lower lead content per gallon.

For the TCP school, the only question is how much?

And, for a third group, there is the notion of a little bit of both approaches.

Beyond discussing those specific questions as they are being worked out in operations of the craft, we'll also take a look, later on, at some of the odd problems that the 'copter may bring as its use is extended.

Perhaps the first rule most operators will want to follow when thinking about helicopter fuels and lubes is to always check with the engine and airframe maker before going far afield from the craft's written specifications.

Here, however, are the operational samples that will show the really wide range of thought on the subject.

The Port of New York Authority, which operates two Model 47G Bell helicopters with 200 hp Franklins, is using a blending technique, to get lower lead content, and is adding TCP in addition.

The blending technique used by the Port Authority in its helicopter operation uses two grades of Shell aviation gasoline, 80 and 100 octane.

The concessionaire who supplies the Port Authority's 1,000-gallon tanks at La Guardia Airport is instructed to fill the tanks with the 100 octane fuel first. When half the vacant capacity has been filled, an equal amount of the 80 octane fuel is put in. The Port Authority, by the way, normally tries to have its storage tanks filled when they can take 800 gallons.

The two fuels, blended in the tanks, of course, come up with an entirely new lead content and with an octane rating of about 91.

The lead content is about 2.5 cubic centimeters per gallon of fuel, which is lower than the usual 3 c.c. content of 91 octane av-gas and, of course, lower than the two lead content grades offered for 100 octane fuel—3 and 4 c.c.'s.

The Port Authority, through its expert heliport supervisor, Phillip J. Landi, isn't satisfied with the lower lead content alone.

The Port Authority blend of helicopter fuel is given a dose of a half gallon of Shell's TCP for each 800 gallons of the blended fuel. That prescription brings the TCP content just a shade below the tetraethyl lead content, or a trifle more than 2.3 c.c.'s of TCP per gallon of fuel.

Operating their helicopters at 3,000 rpm the Port Authority crews used to look forward to plug changes after as few as five operating hours!

Now, the plug maintenance has changed so that they are only looked at every 25 hours in the normal course of operation and probably could go much longer without even cleaning if there were any reason for it.

When the PA's Bell 47G's get caught for fuel where they cannot get the usual blend of 80-100, the pilots call for regular 91 octane av-gas. But they also have some TCP on board to put in with it. In each of the 'copter's there is a special TCP bottle from which a plug-saving shot can be measured when using untreated fuel with its half cubic centimeter extra of lead per gallon.

At the opposite end of the scale there is the "no TCP" operation of New York Airways which, with its mail contracts and charter-taxi work is one of the busiest of helicopter operators.

The 'copters operated by New York Airways are the Sikorsky S-55's with 1340-40 Pratt and Whitney engines.

The fuel for this operation is Shell 87 octane aviation gasoline. No TCP is used.

The lead content of this grade fuel is only about one-half c.c. per gallon and, as a result, Ray de Haan, New York Airways' manager of maintenance, reports that the engines are getting 150 hours work out of their plugs.

Away from NYA's home base at La Guardia, where the operation has its own tank truck of the conventional sort, the helicopters order 91 octane. The brands used are Shell and Texaco.

As an excellent example of a private helicopter operation, there is the operation at N.Y. Trap Rock Co. where William Barolet puts a Bell 47G through its paces and makes possible executive travel between spread-out operations as well as minutes-rather-than-hours replacement of parts at the company's plants.

Barolet keeps his ship going with Gulf 100 and about 2.9 c.c.'s of TCP per gallon—usually measured out as one ounce for ten gallons of fuel. The plugs are cleaned and gapped at 25 hours but show no fouling.

Previously, Barolet had tried 91 and even 80 grade fuels but because of heavy load demands, in the summer particularly, found that fouling was too great and that cylinder head temperatures went up too much. Even at low power settings, as an emergency usage, plugs did blacken badly, according to Barolet.

Barolet points particularly to a general warning for helicopter users in particular: beware stale gas, it tends to collect higher concentrations of lead than are healthy for a high output engine.

An extensive helicopter operation with wrinkles of its own is that of the Aviation Bureau of the New York Police Department under Acting Lt. Kenneth Johnston.

The police bureau, in its five Bell 47's, uses Shell 100 octane and also adds Shell's TCP. The bureau's maintenance schedule calls for plug cleaning every 25 hours but, Lt. Johnston reports, that is purely preventive maintenance. The plugs actually do not need it, thanks to the 100 octane-TCP mixture and despite the 3 c.c.'s of lead in every gallon of fuel that goes through the system.

The measurement system used by the Aviation Bureau, and certainly with signal success so far, is a strong indication that the addition of TCP to fuel need not be a particularly mysterious chore.

The Aviation Bureau's formula is simply "a Coke bottle and a half to 330 gallons of aviation gasoline." The way that works out is to about 1.5 c.c. of TCP per gallon.

Before the "Coke bottle and a half" treatment, Lt. Johnston can remember days when the long-hour demands made upon the police craft sometimes saw as many as three sets of plugs in and out of the engines in a single working-flying day.

All of the Aviation Bureau's fuel, incidentally, is filtered through chamois.

One technique of this pioneer police aviation bureau that may be of particular interest to private operators of helicopters in certain areas and under certain circumstances is the bureau's storage of emergency fuel. At four points around the city where there is landing space, the end of a pier, etc., the bureau has stored 15 gallon safety-cans of fuel to be used at those times when the craft must continue operation

(*Continued on page* 40)

Sub-Miniature Gyro-Compass Tested For Airborne Use

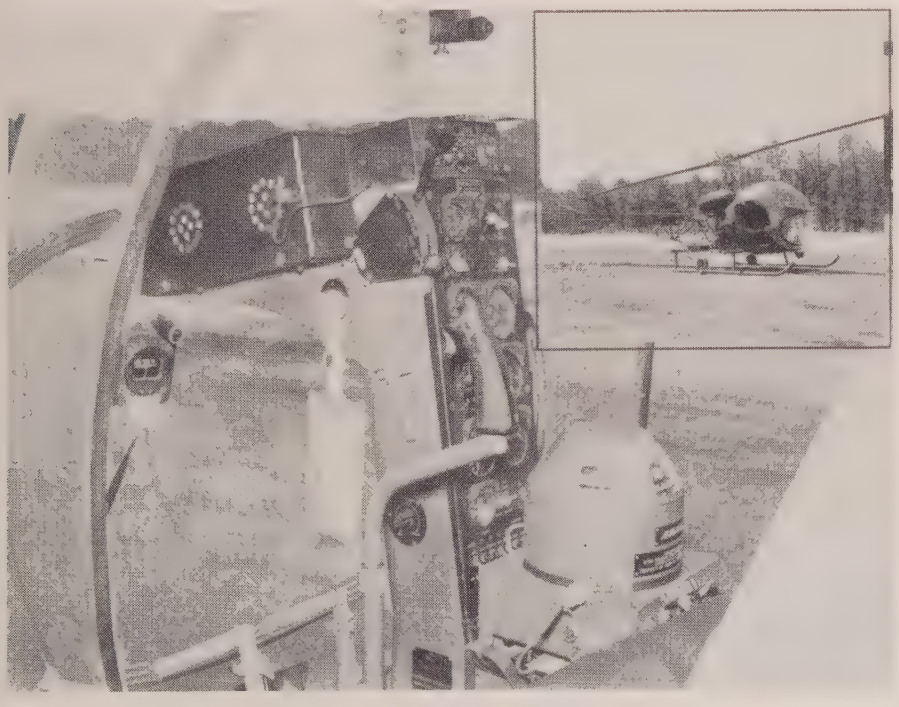
A new subminiature gyro-compass less than two percent the size but as accurate and tremendously more rugged than previous, similar devices employed in all fields including naval and military armored, has no magnetic reference, is true north-seeking and is no larger than a paratrooper's boots. It can easily be mounted in cockpit or remoted (and a cockpit repeater of normal instrument size employed). It is rugged enough to perform accurately in an Army tank operating over rough terrain and was demonstrated at Fort Belvoir, Va., in a Bell 47 model helicopter.

Requiring no special tender handling nor skilled operation, the compass is impervious to magnetic storms, changes in magnetic structure of the vehicle or aircraft frame, and d.c. fields from motor or radar operation. Deviation corrections are eliminated and operation in high latitudes is without restriction as compared to other compasses.

To be manufactured and distributed by the Arma Division of American Bosch Arma Corporation of Roosevelt Field, Long Island, details of the compass are not classified. Total weight is 22 lbs—18 lbs for the gyro unit and 4 lbs for the control unit. Overall space needed is a 10½" cubic area. All major parts are standardized and are readily replaceable with interchangeable parts that do not require the compass to be recalibrated, or even to be readjusted.

As a directional gyro, azimuth drift rate performance is 0.1°/hr—has an accuracy of ½° when used as a gyro compass. It settles instantly when slaved to a corrected magnetic compass and requires no course corrections from speed-latitude tables. Accurate performance is claimed in latitudes as high as 80°. Standard synchro transmitters are employed, repeater synchronization is automatic and the unit is available with either magnetic or transistor amplifiers. Being lubricated for life, it requires practically no maintenance and is both dust-proof and drip-proof. The standard synchros can also supply heading information for automatic steering.

The sensitive element—the heart of the compass—may be removed by loosening a few screws. It consists of a spherical gyro unit and gimbal ring suspended in neutral buoyancy in a high-density fluid, centering being accomplished by frictionless torsional members through which control torques are also applied. This assembly is small and trouble free because Arma's suspension system eliminates all the gyro gimbal bearings and their friction, eliminates torque motors and their associated amplifiers—and results in a system which is insensitive to wide variations in voltage and frequency. Although the sensitive element is a highly precise component, the same immunity to shock offered by a fluid suspension system when the compass is operating also protects it against shock during storage and handling. Extreme care is not required.



Continuous Weather Broadcast Service Extended

The Department of Commerce plans to establish twenty-one additional continuous flying weather broadcasts patterned after the very successful Arcola, Va., (near DCA) LFRange broadcast that has been in service test since October 1954.

The service provides a continuous broadcast of aviation weather *and Notices to Airmen*, consisting primarily of the pertinent flying weather and the condition of runways, airports and navigational radio aids. Los Angeles will be the next of the stations to be installed, and the remainder to follow will be:

Albuquerque, New Mexico
Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Denver, Col.
El Paso Texas
Fort Worth, Tex.
Indianapolis, Ind.
Kansas City, Mo.
Memphis, Tenn.
Minneapolis, Minn.
New Orleans, La.
New York, N.Y.
Oakland, California
Pittsburgh, Pa.
Portland, Oregon
Seattle, Wash.
St. Louis, Missouri

The Weather Bureau has also announced that it will install at least eight automatic weather reporting stations similar to the ones being installed at Worcester, Mass., and Front Royal, Va. These stations are capable of reporting temperature, dew point, wind direction, speed, altimeter. Ceiling and visibility will be measured by fixed beam ceilometer and transmissometer.

New Long-Range Radar Commissioned at New York Center

The commissioning of the new General Electric FPS 8 long-range radar at the New York Center is expected to considerably alleviate the acknowledged traffic congestion for which the New York area is noted. Because of this now world-famous situation, this latest model surveillance radar with a range of over 100 miles in every direction will integrate with the already-installed Airport Surveillance Radars at Newark, Idlewild and La Guardia to establish and maintain a rapid and more logical flow of traffic.

Heretofore, faster aircraft arriving in the metropolitan approaches often had to circle, waiting for slower aircraft cleared in below them enroute that arrived over an outer fix earlier but were overtaken and passed subsequently. Now, the long-range Center radar will be able to safely guide the faster aircraft through the altitude of, or around the slower aircraft enroute so that both will commence their approach in a more proper and logical sequence. This should serve to keep a more efficient flow of traffic to the already-radar equipped Approach Control facilities of the towers so that they will no longer operate in sporadic bursts of hi-intensity traffic or end up clearing some aircraft at high altitude number one to approach.

Similarly, easement of the standard ANC/IFR (non-radar) standards of separation (60 mile blocks of airspace) heretofore hampering the Center's operation in favor of the radar five-mile standard will considerably expedite departure traffic. Aircraft used to take off in closely coupled small groups of a half-dozen. Then, because "Airways" was saturated under application of standard ANC/IFR, dozens of aircraft sat on run-up stands and taxi-strips until the first group cleared out of the area or the initially assigned altitudes. Now a continuous flow of departures may result as the Center employs the FPS 8 radar to stretch both the distance and altitude limits of radar Departure Control.

As a sort of bonus, the contribution of the new Center radar to lost aircraft procedures, augmenting the previously available services, may go a long ways towards shortening the delays encountered every time an enroute aircraft becomes unsure of his position.

Electronic Flash Approach Lights at Idlewild

A fitting finale has been written to the long-drawn out controversy over the relative value of the various kinds of hi-intensity approach light systems, with the commissioning at Idlewild of the sequence flashing condenser discharge approach lights. They replace much-discussed slope line lights with which the pilots were never happy and which took a tragic airline crash to initiate their removal. The Idlewild installation is the latest version of the Strobeacon centerline approach system and greatly enhances the low instrument approach capabilities of the Idlewild system.

To the approaching pilot in clear weather, the lights resemble nothing so much as a white-hot football traveling at supersonic speed toward the approach end of the runway. In low visibility, the light flash most resembles a beckoning point of light unmistakably drawing the pilot towards the runway, not unlike the commercial moving neon sign that calls the passerby's attention to the entrance to Sloppy Joe's drink emporium.

Consisting of 20 Strobe lights in a single 2,000 foot row in the approach path, each unit employs a hi-intensity xenon flash tube producing an ultra-brilliant and extremely short-duration flash of over 30 million candlepower! Each tube fires twice every second; the units flash in sequence toward the runway. They have even been compared to giant tracer

Air-Aids Spotlight

WESTERN VOR's *temporarily shut-down for modification—HASSAYAMPA, Ariz., HOBBS, N. Mex., ELDORADO, Ark., LAREDO, Tex., MINERAL WELLS, Tex., YUMA, Ariz.*

EASTERN VOR's *due for temporary shut-down for modification—ALBANY, N. Y., ALLENTOWN, Pa., BRADFORD, Pa., BUFFALO, N. Y., CROSSVILLE, Tenn., DYERSBURG, Tenn., SELINGSGROVE, Pa.*

ALLENTOWN, Pa.—*Station identification changed to "ABE" all facilities.*

BATTLE CREEK, Mich.—*Control tower operating 0800-2400E. Receives 3023.5, 122.1, 122.5. Transmits 272, 396, 122.2. Two-way communications on 118.3, 121.5, 121.9, 126.7.*

BOSTON, Mass.—*FRANKLIN FM now identifies 3 dashes.*

CHICAGO, Ill.—*LOWELL, Ind., FM decommissioned.*

DOVER, Del.—*LFRange converted to Homing facility only same freq.*

MARATHON, Fla.—*Radio beacon commissioned on 239 KC, "MTH" at bend in Amber 7 MIAMI to KEY WEST.*

MEMPHIS, Tenn.—*ILS Outer Locator frequency now 287 KC, BRUIN MHW 215 KC.*

NEW YORK, N. Y.—*IDLEWILD Approach Control freq. changed from 124.9 to 123.9.*

RAPID CITY, S. D.—*LFRange frequency now 254 KC.*

ST. PETERSBURG, Fla.—*PINELLAS COUNTY Tower switching to 122.7 mc. receiving.*

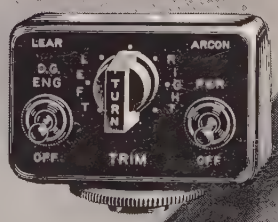
SAN DIEGO, Cal.—*VOR identifies "SDA" now.*

SAN FRANCISCO, Cal.—*VOR identifies "VSF" now.*

SIOUX FALLS, S. D.—*ILS Outer Locator frequency now 219 KC.*

TORONTO, Ont.—*Homing beacon commissioned on 236 KC "KG" at KLEINBURG, 14.5 miles out on North leg of LFRange.*

Any pilot can get vertigo but the Lear ARCON* can't



*Automatic Rudder Control

fly in instrument weather without an instrument rating!

INC., LearCal Division, 3171 South Bundy Drive, Santa Monica, California

LC-25

shells, rapidly fired from a point in space toward the runway. They can not be mistaken for anything else, and no other system of highway or industrial lighting resembles them.

Produced by Sylvania Electric Products, Inc., of New York, their fog-piercing qualities are such that visual orientation commences before the pilot is below the base of the overcast condition and before he can distinguish individual lights or other ground reference in day or night. The extremely short duration of the flash (about 1/5000th of a second) does not permit retention of the image by human eyes, hence the pilot's eyes are not affected and he does not lose night vision.

Successful approaches have been made in "zero-zero" conditions by these lights and it is felt that their effect in reducing the percentage of missed approaches in any very low weather condition will have far-reaching effect in increased schedule reliability, and shorter delays in approach patterns wherever they are installed.

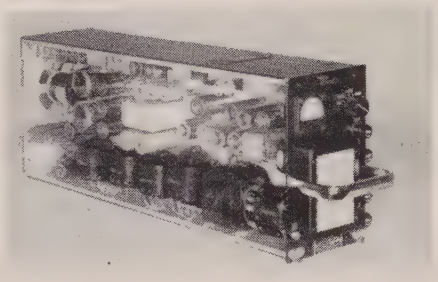
Bendix Airborne Radar Weight Cut Drastically

The increase in the use of any new advance in navigational or safety device is often directly proportional to both its cost and weight penalties. Cost is sometimes not too much a factor because many aircraft operators reckon safety before cost. But weight and size considerations can make it impracticable to install a new device.

With this thought in mind, Bendix Radio Division of the Bendix Aviation Corporation, Detroit, Mich., has announced a lighter ½ ATR synchronizer-power supply unit for their RDR-1 airborne weather radar system (both Bendix X-band and C-band) that weighs 21 pounds—27 pounds lighter than its larger predecessor, used since the Bendix airborne weather radar was introduced in June of last year.

In going to the lightweight design, Bendix Radio engineers have also reduced the number of vacuum tubes used from 32 to 19, promising greater reliability. They have also given the device a new look—air filter, chrome plated handles, etc. (see cut). The unit, called the SYN-1B is designed to operate with the industry-standardized gyro output voltages and incorporates a flush-mounted blower.

The weight of a single-indicator radar system with shockmounts now is only 117 pounds. Both a 22-inch and a 30-inch antenna are available for both X-band and C-band radar, all weighing about 25 pounds. The antenna tilt control of the CON-1D (X-band with radar beacon switch) will



be calibrated in one-degree increments. The new indicator (PPI-1D scope) employs a permanent magnet decentering system completely eliminating any tendency towards the formation of a "hook" at the vertex of the rotating sweep line on the pilot's viewing scope.

Also emphasized is the fact that AC power consumption has been reduced considerably for the RDR-1 system. With the use of one indicator, power consumption for the X-band system is now approximately 790 VA and 880 VA for the C-band. This fact, combined with the greatly decreased weight and size of the power supply-synchronizer, suggests a widened market for the equipment, which may soon include the new light twins.

New N. Y.-Phila. Area Preferential Routings

In order to acquaint pilots filing IFR plans into and out of the New York and Philadelphia metropolitan areas with the latest revised preferential routings, the New York ATC Center has published the following Victor airway routings. Preferential Low Frequency routes will be published in a separate bulletin, but for the present pilots finding it necessary to use LF routes are asked to file such LF routes as overlie the prescribed VHF routes insofar as possible.

Also, if pilots for reasons of adverse weather, inoperative facilities or atmospheric disruption of communications feel it necessary to file other than the preferential routes they are requested to so advise at time of filing.

The first fix shown in the departure routings is normally the short range clearance limit and the pilot will be given climb-out instructions to these fixes prior to takeoff.

In the bulletin, pilots will note specified altitude blocks allocated to IFR flights along certain route segments for one-direction traffic.

DEPARTING IDLEWILD AIRPORT

DESTINATON	VICTOR ROUTE
NORTH	
Albany, N.Y. or over	Glen Cove, Syosset V91
NORTHEAST	
Hartford, Conn., or over	Glen Cove, Syosset V167
Boston, Mass., or over	Riverhead V16
EAST	
Nantucket, Mass. or over	Riverhead V46
SOUTH	
Atlantic City, N. J. or over	Woolf Coyle VI
SOUTHWEST	
Philadelphia, Pa.	Woolf Coyle G5 B20
Washington, D. C. or over	Woolf Coyle G5 V16 Andrews Direct
WEST	
Pittsburgh, Pa.	Stroudsberg, VI88, V119 Butler Direct
Columbus, Ohio or over	Stroudsberg, V188, V119 Butler R8, V12
Cleveland, Ohio	Stroudsberg, V188, V14
NORTHWEST	
Chicago, Ill. or over	*Stroudsberg V188, V184, V116
Detroit, Mich. or over	*Stroudsberg V188, V26
Buffalo, N. Y. or over	*Stroudsberg, V153, V36
Rochester, N. Y.	Glen Cove, Syosset V91, V34
Syracuse, N. Y.	Glen Cove, Syosset V91, V34, V29

Based on Idlewild/Newark Radar hand-off; when not utilized, routing will be Glen Cove, New Rochelle and the appropriate LaGuardia northwest bound routing.

DEPARTING LaGUARDIA AIRPORT

DESTINATION	VICTOR ROUTE
NORTH	
Albany, N. Y. or over	1. Wilton V91 2. Poughkeepsie LF, V39, V91
NORTHEAST	
Hartford, Conn. or over	Bay V167
Boston, Mass. or over	1. Bay V167, V34, V16 2. Glen Cove V46 Riverhead V16

EAST	
Nantucket, Mass. or over	Riverhead V46
SOUTH	
Atlantic City, N. J. or over	1. Colts Neck VI 2. Belle Mead V3, V29, V1
SOUTHWEST	
Philadelphia, Pa.	Belle Mead V3, B20
Baltimore, Md.	Belle Mead V3, V31
Washington, D. C. or over	Belle Mead V3 Lisbon, Riverdale A7
WEST	
Pittsburgh, Pa.	Branchville V36, V58, V188 V119 Butler Direct
Columbus, Ohio or over	Branchville V36, V58, V188 V119, R8, V12
Cleveland, Ohio	V36, V58, V188, V14
NORTHWEST	
Chicago, Ill. or over	Branchville V116
Detroit, Mich. or over	Branchville V116 Erie, V14N, V188, V26
Buffalo, N. Y. or over	Branchville V36
Rochester, N. Y.	1. Branchville V36, V29, V34 2. Wilton V34
Syracuse, N. Y.	1. Branchville V36, V29 2. Wilton V34, V29

DEPARTING NEWARK OR TETERBORO AIRPORT

DESTINATION	VICTOR ROUTE
NORTH	
Albany, N. Y. or over	Poughkeepsie LF V39, V91
NORTHEAST	
Hartford, Conn. or over	Poughkeepsie LF V39, V58
SOUTH	
Atlantic City, N. J. or over	Colts Neck V1
SOUTHWEST	
Philadelphia, Pa.	Belle Mead V3, B20
Baltimore, Md.	Belle Mead V3, V31
Washington, D. C. or over	Belle Mead V3, Lisbon, Riverdale, A7
WEST	
Pittsburgh, Pa.	Stroudsburg, V188, V119, Butler Direct
Columbus Ohio or over	Stroudsburg, V188, V119, Butler, R8, V12
Cleveland, Ohio or over	Stroudsburg, V188, V14
NORTHWEST	
Chicago, Ill. or over	Stroudsburg, V188, V164, V116
Detroit, Mich. or over	Stroudsburg, V188, V26

INBOUND IFR FLIGHTS
NEW YORK AREA

FROM	TO	VICTOR ROUTE
NORTH		
Albany, N. Y. or over	EWR, TEB	V91, V39, B18 Patterson Direct EWR LOM
	IDL	V91
	LGA	V91 Wilton A7 RWC R3
NORTHEAST		
Boston, Mass. or over	IDL	V16, V46, G5 Mitchel Direct Idlewild
Hartford, Conn. or over	EWR, TEB	V3 Paterson Direct EWR LOM
	IDL	V167
	LGA	V3 Wilton, A7 RWC R3
EAST		
Nantucket, Mass or over	IDL	V46, G5 Mitchel Direct Idlewild
	LGA	V46 Glen Cove Direct New Rochelle R3
SOUTH		
Norfolk, Va. or over	EWR, TEB	V1 Colts Neck Direct Woodbridge EWR LOM
	IDL	V1 Coyle G5 Point Pleasant Direct
	LGA	V1 Colts Neck G3

SOUTHWEST		
Washington, D. C. or over	EWR, TEB	Riverdale Baltimore V140, A7
	IDL	Riverdale Baltimore V140, A7, V140 B18
	LGA	Riverdale Baltimore A140, A7, V140 Colts Neck G3
WEST		
Pittsburgh, Pa.	EWR, TEB	V58, V6, A7
	IDL	V58, V6, V16, B18
	LGA	V58, V6, G3
Over Pittsburgh, Pa.	EWR, TEB	V12, V162, V39, V6, A7
	IDL	V12, V162, V39, V6, V16, B18
	LGA	V12, V162, V39, V6, G3
Cleveland, Ohio or over	EWR, TEB	V6, A7
	IDL	V6, V16, B18
	LGA	V6, G3
NORTHWEST		
Detroit, Mich. or over	EWR, TEB	V116, V170, V6, A7
	IDL	V116, V170, V6, V16, B18
	LGA	V116, V170, V6, Gd
Buffalo, N. Y. or over	EWR, TEB	V36, V147, V6, A7
	IDL	V36, V147, V6, V16, B18
	LGA	V36, V147, V6, G3
Rochester, N. Y.	EWR, TEB	V147, V6, A7
	IDL	V147, V6, V16, B18
	LGA	V147, V6, G3
Syracuse, N. Y.	EWR, TEB	V29, V34, B18, Paterson Direct EWR LOM
	IDL	V29, V34, V91
	LGA	V29, V34, B18, Peekskill Direct White Plains LOM, Direct New Rochelle, R3

OUTBOUND FLIGHTS
DEPARTING PHILADELPHIA INTERNATIONAL AIRPORT

DESTINATION	VICTOR ROUTE
Wilkes Barre, Pa., or over	Wings B20, V149
Detroit, Mich., or over	°Blue 20, Red 45, V170, V162S, V12, V42
Cleveland, Ohio, or over	°Blue 20, Red 45, V170, V162S, V12, V42
Pittsburgh, Pa., or over	°Blue 20, Red 45, V170, V162S, V12
Washington, D. C., or over	Westchester V3, Lisbon Riverdale, A7
Norfolk, Va., or over	Millville P49, V1

INBOUND IFX FLIGHTS
TO PHILADELPHIA INTERNATIONAL AIRPORT

FROM	VICTOR ROUTE
Idlewild Airport	Coyle G5, R73, P20
LaGuardia or Newark Airport	Belle Mead V3, P20
Wilkes Barre, Pa., or over	V29, P20
Detroit, Mich., or over	V116, V23, V12 Westchester Direct
Cleveland, Ohio or over	V6, V33, V12 Westchester Direct
Pittsburgh, Pa., or over	V12, Westchester Direct
Washington, D. C., or over	Baltimore V140, A7
Norfolk, Va., or over	V1, V29, New Castle Direct

° This routing to be revised with the commissioning of the Pottstown VOR

ONE-DIRECTION ALTITUDE BLOCKS

Airway	*From*	*To*	*Altitudes*	*Flight Dir.*
V140 A7	DCA Bdry	PHL	6,000 thru 12,000	North (enrt ovr PHI)
V3/R72	CAT	DCA Bdry	4,000 thru 12,000	South
V10 V6 G3	PSB	BMD	7,000 thru 17,000	East
R8	CAT	SSB	3,000 and up (all alts)	West
V116/V36 R23	PNJ	AVP VOR	MEA and up (all alts)	West
V3/A7	BOS Bdry	ILT PCH	6,000 thru 9,000	South
G5	HEM	BOS Bdry	3,000 thru 5,000	North

You drive it up!

Never before an airplane as easy to handle as this. It's easy to hold straight down the runway. Just ease back on the wheel and you're off.

You drive it down!

You don't have to stall or "drop" in . . . you can drive in without fear of nosing over. Extra-wide span gear, low center of gravity reduce danger of ground looping.

You drive it around!

Perfect control from the steerable nose wheel the instant you touch ground . . . and as you taxi around. Turns on a dime, parks easier than an auto.

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You must "drive" this airplane to appreciate it!

Words can't tell the whole story. We urge you to drive this new airplane at the first opportunity. It makes flying easier for professionals...even more practical for those who don't have time to become "professional" amateur pilots!

It's smart . . . it's luxurious . . . but more important, you can see and feel quality engineering and construction in every part . . . from big, Paralift Flaps to luxurious interiors. Drive the Cessna 172 today. Only $8,750 f.o.b. Wichita, Kan. See your Cessna dealer (Yellow Pages of phone book) or write: CESSNA AIRCRAFT COMPANY, Dept. S-5, Wichita, Kansas.

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Round Table

(*Continued from page* 16)

that in mind, we have de-emphasized speed somewhat. Our basic engineering and development effort has been toward improving the economics of rotorcraft. Our line of approach has been toward simplification of mechanisms and maintenance techniques, which reduces cost.

"We are definitely commercial-minded, although the only aircraft we have sold to date have been to the military. These aircraft have been sold under commercial-type certification which we are within a week or 10 days of receiving.

"I would add that our several design studies, one of them extensively on larger aircraft, bring out what Tug mentioned, that the payoff of utility and economics as the size goes up is not going to be accompanied by a penalty of increased space and ground facility problems as has been the case with fixed-wing aircraft."

John Wiley: *"Mr. Waters, would you care to supplement Mr. Doman's remarks?"*

Donald S. B. Waters (Doman Helicopters, Inc.): "In looking at the economics of the helicopter, we recognize that by far the greater factor between first cost and operating cost is the latter. As Mr. Doman has stated, our basic engineering and the patents we have developed have been dedicated primarily to the simplification of the rotor system so as to eliminate some of the basic problems of vibration. This in turn will decrease the design requirements of the transmission and monocoque structure which will permit our helicopters to carry a greater useful load ratio than heretofore possible and also will provide a corresponding reduction in operating cost.

"Looking ahead we feel that at least 60 to 65 per cent of our business will be in the foreign commercial market. During the past year or so the number of inquiries we've received from foreign countries has gone up perhaps three or four times. The principal reason is the increased realization that the helicopter can serve a need that cannot be met by any other form of transportation, particularly in short-haul where there are serious geographical obstacles."

John Wiley: *"Mr. Kirchner, would you care to comment for Kaman on the general adaptability of your product to this increasing need for commercial helicopter service?"*

Charles Kirchner (The Kaman Aircraft Corp.): "Today, Kaman Aircraft is engaged in the production and development of helicopters for the military services. Two of the projects which we are carrying on at our plant under military contracts will have a considerable amount of bearing on the commercial helicopter of the future, however. The first of these projects is the application of gas turbines as helicopter powerplants.

"We were fortunate enough back in 1951 to pioneer in the helicopter gas-turbine field when we flew a Kaman K225 helicopter powered by a Boeing 502 gas turbine. This was on a contract with the Navy Bureau of Aeronautics. The success of that program led the Army Transportation Corps to take a considerable interest in the application of gas turbines as helicopter powerplants. We received a second contract—co-sponsored by the Army Transportation Corps and the Navy Bureau of Aeronautics—for which we are flying a Kaman HTK powered by two Boeing gas turbines. We are firmly convinced that the gas turbine is the answer to the helicopter powerplant problem. I don't mean to imply that the gas turbine is going to replace entirely the piston engine, but in most cases we will see the gas turbine taking the place of the piston engine as the powerplant for helicopters."

John Wiley: *"Might I interrupt there to ask if in this particular application you are gearing the turbine engine to the rotor or is it a reaction type of thing?"*

Charles Kirchner: "This is gearing the turbine to the rotor, a turbo-rotor helicopter. Because of its performance characteristics, its mechanical simplicity, its light weight, its lacks of vibration and other things, the turbine has a great many advantages over the piston engine.

"Just take the point of engine overhaul: a piston engine in a fixed-wing airplane normally may run 1,000 hours between overhauls, but in helicopter operations it usually is only three to four hundred hours. Now with the turbine, as far as its life span between overhauls is concerned, it does not make much difference whether it is in a helicopter or a fixed-wing airplane. The turbine life span between overhauls is the same."

John Wiley: *"Have you any views as to the relative severity of the external noise between the turbine and the piston type of installation in helicopters?"*

Charles Kirchner: "I can speak only for the type of turbine we are using, a small one of 190 hp. In the HTK with its two turbines of 190 hp each, or a total of 380 hp, the noise level is far below that of the HTK powered by one 245 hp piston engine. We haven't done any work with the larger turbines so I don't feel I can talk about them."

Frank MacMahon: "We recently had some people up to witness a flight demonstration of the twin turbine-powered YH-16A. It has two Allison T-38's. During the course of the demonstration, with the helicopter approximately 500 yards away from the visitors, one of our H-21 helicopters passed about 300 yards beyond and behind the YH-16A. The noise of the H-21 drowned out the noise of the YH-16A. In other words, at a greater distance the 1425-hp single piston engine was noisier than the two Allison turbines." (While on a routine experimental test flight on January 5, 1956, Piasecki's YH-16A crashed in New Jersey approximately 10 miles from Philadelphia's International Airport. Both pilots were killed. Preliminary investigation indicates that failure of special test equipment might have caused the crash.)

Charles Kirchner: "That certainly has been our experience with our turbo-rotor helicopters. Unlike a jet aircraft where you are blowing the exhaust out the back end and creating a lot of noise, the exhaust of a turbo-rotor helicopter is being utilized to drive the gear box and there is very little noise left in the excess jet exhaust. The noise level is much lower. We have found this to be true with the small units, and apparently you found it true of the larger turbines too.

"Turbine fuel consumption is being reduced all the time. The fuel consumption of piston engines, five, 10 or 15 years ago was a lot greater than it is today, and there is no reason why the fuel consumption of the turbine cannot be brought down to a level comparable to the piston engine. I think it is getting there very fast.

"The other development we have which may eventually have some bearing on commercial helicopter operations is a remote-control helicopter which we have been flying for the Office of Naval Research. This ship first took to the air a little over two years ago. As of this date we have about 250 hours of remote-control operation on it. The ship is operated by a man at a ground control station. It is taken off, hovered, flown in all directions, backwards, forwards, sidewise and vertically, and then brought back and landed. I don't mean to imply that you are going to sit in an office somewhere and fly commercial helicopters by remote control, but in order to fly that helicopter remotely we have had to develop an autopilot and the accompanying electronic and mechanical systems that go with it. Certainly that equipment could have a lot of bearing on bad-weather flying. We might go so far as to be able to fly and land helicopters remotely in extremely bad weather conditions by coupling the remote control feature with radar or some other means of surveillance."

John Wiley: *"Glen, two years ago you said that the twin-engine helicopter was a necessity in scheduled operation. Do you still feel that way about it?"*

Glen B. Eastburn: "Very definitely. Our performance on the single-engine is approximately 85 per cent. During the month of November it was just a little under 80 per cent. That performance does not meet the demands of traffic, particularly passenger traffic which depends upon the helicopter to meet scheduled fixed-wing operations. While the S-58 will be a step forward, it still is not the final answer to meeting the conditions of traffic in the metropolitan area. We must have reserve power which will enable us to operate under instrument conditions and with lower minimums than we are now operating."

John Wiley: *"I suspect you feel the same way."*

E. Tug Gustafson: "Yes, we do. We recognize that scheduled helicopter operations should be at least twin-engine. Like all the other manufacturers in the industry, we are aiming our advance thinking toward that goal. However, I think it is going to be three or four years before you get a twin-engine aircraft for scheduled operations at a seat cost that makes sense and at the payload you want. You have to build up to that type of equipment.

"We feel that with the S-58 we have answered two fundamental problems. We have increased performance and payload. The next logical step definitely will be the twin-engine configuration. Our basic thinking is that we will be able to take our existing aircraft, our existing basic design, and simply add powerplants which will give the scheduled airline operators the twin-engine reliability and all-weather operation they have been looking for. But you creep before you walk. We feel that the step from the S-55 through the S-58 and then into the S-56 or additional configurations of the S-58 will give the scheduled operators their twin-engine aircraft in a minimum of three years from now. We quite concur that it is necessary."

John Wiley: *"Do you share Mr. Kirchner's view as to the possible future application of gas turbines as helicopter powerplants?"*

E. Tug Gustafson: "Yes, we do. Our studies are pretty consistent with Kaman, Piasecki, and the rest. It looks like the turbine is the next logical development in the 'copter powerplant installation."

Tom Sullivan (Port of New York Authority): "Tug, do you feel that with the twin-engine you are going to get good single-engine performance? Will you be able to hover on one?"

E. Tug Gustafson: "When you get into this twin-engine, single-engine performance, everybody looks at twin engines as the criteria for safety of operations, so that if you are cruising along and lose an engine, you are going to be able to get back where you started or continue to your destination. If you review the single-engine helicopter operation records of New York Airways, Los Angeles Airways and Sabena, you'll find there have been engine failures. But in every case they have been able to get down without damage to the aircraft, at least to any extent, and without injury."

Tom Sullivan: "Yes, but these operations have been restricted to VFR conditions and I presume we are talking about IFR."

E. Tug Gustafson: "We feel that if you

can build a twin-engine transport helicopter with single-engine reliabilty in cruise, in take-off and in landing, you then open up an entirely new scope of operation in the short-haul transport market. Conceivably, with that kind of performance you can take off, rise vertically to a given altitude and then start your cross country. If you lose an engine on the cross country, you can continue your path of flight to your destination. Again, because of the single-engine dependability, you will descend vertically to your heliport regardless of the weather conditions. We feel this is being very realistic and will happen in the future."

Tom Sullivan: "When you say descend vertically, you mean at a glide angle?"

E. Tug Gustafson: "No, I mean vertical —straight up and down on instruments."

Frank K. MacMahon: "Going back to Tom Sullivan's question on good single-engine performance and ability to hover with one engine out, the normal gross weight that is selected for a given design will dictate the one-engine-out performance capability. The normal gross weight at which the helicopter would be capable of hovering with one engine out will be higher in the case of three or four engines than with two engines because of the higher percentage of power remaining. But with a two-engine helicopter, the ability to hover with one engine out is, of course, possible if the gross weight selected is low enough. However, economic considerations may dictate that such a low gross weight is not feasible."

Glidden S. Doman: "We have talked here about two or more engines. But one doesn't study power vs. speed requirements of a helicopter long before realizing that one characteristic of the turbine, namely, that is thrives on high power operation and offers its best fuel economy at high-power operation, indicates that more than two turbines would be best. Now if it is more than two, then the quality of performance you are going to get with one out is going to improve your ability to come in through the hover condition."

E. Tug Gustafson: "Which makes your vertical take-off and descent become more realistic as time goes on in our studies. Furthermore, you are able to match the power requirement to high-power running of the engines and your fuel economy improves."

Tom Sullivan: "Do you concur with Tug's opinion that under IFR conditions pilot technique and navigational aids will permit vertical descent into a heliport?"

Glidden S. Doman: "We have been doing it recently. We haven't done it with any ground aid, but we have done it with the man in the ship acting as the ground equipment of the GCA man. And I mean into hovering and a vertical let down."

John Wiley: *"That brings us now to another phase of the discussion. I would like to get some of CAA's thinking on the air-traffic problems connected with the operation of helicopters, under both VFR and IFR conditions, and particularly in congested terminal areas. Harry Bernard, would you care to comment?"*

Harry Bernard (Civil Aeronautics Administration): "I was very much interested in hearing some of the remarks of the manufacturers about the probable performance of the multi-engine helicopter. There does not seem to be any unanimity of thinking on exactly what twin-engine performance in the helicopter will mean. A lot of people are looking at it with fixed-wing thinking principles; that is, you will have climb performance with one engine out and continue on your flight even at maximum gross weight.

"This principle that Tug mentioned of a vertical ascent to a cruising altitude, proceeding at your cruising altitude to your destination, and then letting down in a vertical descent is something that I don't think has been proposed or talked about at sufficient length at any Round Table. Such an operation means, of course, that we are beginning to think in terms of all-weather operation. Before you think in those terms, there is going to have to be a tremendous increase in the amount of work done on problems other than aircraft performance. I am talking now of the inherent stability of the machine itself, the development of a navigational aid system peculiar to the helicopter, the development of instrumentation which is compatible to helicopter all-weather flying. To my knowledge very little has been done along these particular lines. For example, people are talking of Decca as the number one solution to the navigation problem, but nobody to my knowledge has come forth with an adequate helicopter instrumentation for all-weather flying.

"All this leads me to John's question as to what CAA is going to do with traffic control when we get multi-engine, all-weather helicopters in the New York area. Airways traffic control is not my specialty, but I do have personal opinions. Glen Eastburn of New York Airways has pointed out that his operating batting average is roughly 85 per cent. That is a significant figure because we have VFR conditions in the New York area, a thousand feet and three miles or better, about 85 per cent of the time. It seems to me, therefore, that his batting average is tied in closely with the weather conditions that exist in the New York area.

"Tug was saying that the twin-engine helicopter is three to four years away. He may be a little bit optimistic, but I hope he is right. If it does come within that period, it means that CAA, as the agency controlling traffic in the area, will have to be supplied with the tools necessary for the job. Nowhere, for example, in the ANC Procedures For the Control of Air Traffic does one hear the word 'helicopter' mentioned. It is not introduced at all in any of the principles laid down in that manual, which, of course, is the controller's bible. I think there is going to have to be a high-level conference at which the people who control revisions to the ANC Manual will introduce the word 'helicopter,' and revise the traffic control principles to accept and absorb the helicopter in a metropolitan area.

"Some work is being done on that problem by Howard Higgins, chief pilot of New York Airways, who is chairman of Special Committee 63 of the RTCA. He has introduced the problem recently, and I think we might get some results in the near future. If we do, I think the only way you can satisfactorily accept high volume helicopter traffic in a high density area is by assigning specific block altitudes and specific block routes exclusively repeat exclusively for helicopter use. From the way everybody is thinking at the present time it probably will be the lower altitudes. We already have gone to a principle of one-way airways for the increased fixed-wing traffic in our Civil Airways system. I think our next logical step will have to be an exclusive assignment of altitudes and routes to helicopters."

John Wiley: *"In other words, Harry, you are suggesting an expansion of the altitude and route separation principle to include the helicopter, but employing totally different altitudes and routes from those that now exist."*

Harry Bernard: "Yes, I am not saying that the routes the helicopters will use will have to be the same as fixed-wing routes. They probably will be different because if they do go into all-weather flying, operations is not going to be able to accept VOR and ILS navigation. It would be incongruous in my opinion to ask a New York Airways helicopter departing Idlewild Airport for LaGuardia to fly up Van Wyck Parkway to the Fair Grounds, then to proceed out to the outer marker, enter a holding pattern and shoot an ILS approach for LaGuardia. What New York Airways is selling is time, and they have a 10-minute schedule between those two points. If we have to fit them in with existing fixed-wing traffic control precepts, then New York Airways may end up asking for a bus franchise to Albany."

E. Tug Gustafson: "The more I see of the application of the helicopter in military and commercial projects, plus the work that the manufacturers are doing on this twin-engine and instrument problem, the more I am personally convinced that, unlike what I said a couple of years ago, the twin-engine helicopter will be as capable of flying the weather as your fixed-wing transports.

"Substantiating my thinking is the fact that all-weather flights are taking place today under very extreme conditions in the curriculum of military pilots. Instrument courses are now a must, and with the amount of money being spent by the government and the manufacturers on the study of instruments, it becomes crystal clear that all-weather, twin-engine, three-engine or four-engine or more helicopters are around the corner. I don't think three or four years is being optimistic at all. We might see it a lot sooner. It might very well be that we'll get twin-engine aircraft within four years, with all-weather and navigational instrumentation concurrent with development of the aircraft.

"I am sure the various manufacturers' and government agencies' studies on this will probably bear that out. Two years ago it was a hope, today, it is almost a reality —and I say that cautiously because I am not one who wants to over-sell the capabilities of helicopters."

John Wiley: *"Harry, in that connection would you like to comment on whether or not you think it possible to fit heliports and helicopter traffic into the available airspace in this area?"*

Harry Bernard: "Yes, I think it perfectly feasible and long overdue. I do think

though that before voluminous helicopter traffic is accepted by the airline industry as a whole, it is going to slow down the rapid and expeditious movement of fixed-wing traffic into our metropolitan airports. One of the major obstacles that will have to be overcome is the fixed-wing operator. He will have to be sold on the idea of accepting helicopters in the traffic picture and giving them the position they deserve. That is going to be a selling job on somebody's part."

Tom Sullivan: "Subsequent to the issuance in 1952 of 'Transportation by Helicopter 1955 to 1975,' we, because of the optimistic forecast in the report, set out almost immediately to plan a regional heliport program for the metropolitan area that would satisfy the predicted traffic forecasts. Before we got into the study very far, we realized that our first and uppermost problem, before we started talking about site location and heliport design, was air traffic control. Fortunately, because of Manhattan's characteristics—surrounded by water and all fixed-wing traffic diverted away because of the high structures—we had a natural 'in' via the Hudson and East rivers. However, as we began to filter those airplanes and those traffic lanes into the airports a significant problem developed. That is one of the reasons we considered relocating the proposed second instrument runway at New York International so there would not be a conflict on instrument operation of the helicopter at the airport. If Tug's revisions are anywhere near realistic, some thought has to be given to the navigational aids that are going to be a part of this helicopter and the ground aids to supplement that equipment."

Harry Bernard: "You are quite right, Tom, but if you use your existing Common System for navigating helicopters, what you will have is a fixed-wing airplane flying at 70 mph, and you can't sell that to the public. It has to be an exclusive navigation system designed for helicopter operation.

"The ANDB sent a helicopter up here to fly around the New York area on New York Airways' route system to evaluate the use of the existing Common System navigation aids in helicopter operations. I am afraid that the conclusions of the study would tend to recommend to the parent body of the ANDB that today's Common System is adequate and suitable for future helicopter navigation. Anyone who is as close to the problem as we are knows that that just isn't so. It cannot be done in any area, particularly a metropolitan area. The New York metropolitan airports, particularly LaGuardia, are operating at a high saturation level and to accept an increased number of helicopter operations into LaGuardia is going to mean a complete revaluation of the existing navigational aids and approach paths to LaGuardia Field, as well as other fields.

"New York Airways, being a single-engine operator and operating VFR only at the present time, still represents 13 to 14 per cent of the total movements at LaGuardia. It is second to American Airlines, the number one user of the field. There is no recognition given in the ANC Manual to helicopter traffic; it is done on a trial-and-error method. Before we can go into all-weather operations, we will have to revise the ANC Manual to accept the helicopter as a part of our traffic problem."

Tom Sullivan: "I hope and will try to see that the spring 1956 meeting of the IATA Helicopter Committee digs into this problem of air traffic control and the need for regulations. The traffic forecasts indicate we will have many helicopters flying soon. We must be prepared to handle them without hurting fixed-wing traffic."

John Wiley: *"Gentlemen, we are fortunate to have Bill Barolet with us today. Bill is the pilot for New York Trap Rock Corporation. He represents a very important segment of helicopter use and development, namely, the use of helicopters by corporate executives. Bill, we sure would like to have your views on the subjects that have been covered today."*

C. W. Barolet (New York Trap Rock Corp.): "Our outfit, New York Trap Rock, is relatively new in the helicopter business. After a discussion a couple of years ago between Bill Boss, president of New York Trap Rock, and Horace Brock of New York Airways, Trap Rock hired a helicopter for two months to see if it was feasible for use in their work. This last year, the company decided to go into helicopter operation and had New York Airways recommend equipment. A three-passenger, 200 hp Bell G helicopter was selected.

"New York Trap Rock has quarries up and down the Hudson River—our furthest plant is up at Clinton Point, which is just

south of Poughkeepsie and about 50 minutes out of New York City. We have engineering offices and a shipyard in Newburgh. Executives travel between these plants. We also have an operation out of Verplanck just south of Peekskill, another plant south of that at Haverstraw, and still another at Nyack. Our main offices are on Park Avenue, New York. It totals up to quite a sum when you figure out the amount of time executives spend traveling between plants.

"For example, the president likes to inspect the plants about every two weeks. He would start out in the morning, drive like the dickens, spend a few minutes with each superintendent and then drive on to the next plant. At the end of two days, he had just about covered the plants. Now I pick him up in the morning right at his home and bring him downtown. He spends a couple of hours at his desk and then I pick him up and we start out for plant inspection. Usually, we are back in his own backyard at five o'clock that night. The company, I think, is 100 per cent for the helicopter.

"We try to handle most anything within an hour of a fixed area. I meet planes at the airports and then land downtown—we have a dock which we rent at 54th Street. It takes from five to seven minutes to get from the dock to the office by cab. If somebody has to meet a plane, we can pick him up at 54th Street and in six minutes drop him off at LaGuardia. I can drop him in about seven minutes at Newark.

"We use New York Airways' dispatch service. A lot of times I'll have a passenger who wants to go to a certain place. I tune to 131.9, give the dispatcher a call, check the weather and usually we'll be on our way in minutes."

John Wiley: *"Your experiences, Bill, certainly parallel ours with the helicopters operated by the Port Authority. Our Bells are serving the 17 facilities we have around the metropolitan area very efficiently.*

"We have with us a representative of Bell Aircraft. Bell, of course, manufactures the machine that is used very largely for the non-scheduled operation, the private, executive and corporate type of activity. Mr. Pierrot, would you care to comment on what steps Bell is taking toward reaching further into that market?"

A. Ogden Pierrot (Bell Aircraft Corp.): "We have the Model 47 and I am sure everyone is familiar with the four-place version, the J model, which is now being built for the Navy. We hope to make it available to the civil market by the middle of 1956.

"I was very interested in Mr. Doman's remark about the efficiency of turbines. We now have in the works a modification of our HST, the large Navy job with a single 2800 engine. An adoption of it will take three Lycoming turbines. These turbines derated will put out just under 700 hp each. The improvements which these turbines will make possible are the leading of the shafting to the two rotors and the mounting of the engines in a little compartment above the main cabin aft. Walkways for service in flight will be provided.

"These improvements should make possible a solution of the noise problem which seems to be worrying our cabinet officers. We look for a lot smoother operation, and with the three turbines we feel we are going to be on the right road as far as safety in operation is concerned. With full maximum gross, this job is calculated to hover on two engines. I think that the smaller model with one Lycoming turbine, which we now are working on under a service contract, would be a five or six place commercial vehicle."

E. Tug Gustafson: "When you analyze the applications of the commercial helicopter and the growth of the commercial market, it boils down to three basic factors: 1) the requirements of industry, 2) the necessity for an aircraft, or a helicopter in this case, to meet that requirement and 3) that it meet it within an economic range. If you can get the three together, then you have yourself a market."

Tom Sullivan: "The fourth factor is the ideal location of the heliport. After you get the helicopter and its operational characteristics, it won't handle traffic unless you get an ideal heliport location."

E. Tug Gustafson: "An industry spending a great deal of money purchasing commercial helicopters is the oil industry. The work they are doing in using rotary wing aircraft for development of their program is quite outstanding. They are depending more and more upon rotary wing aircraft to solve and alleviate their transportation problems. In developing a helicopter to meet their needs, one which must fly around the clock and eventually in all kinds of weather, they are definitely pioneering a very big overall scope of operation that will have a direct bearing on the operations of New York Airways, New York Trap Rock and others.

"Actually, they are using the helicopter as a daily tool in their oil searching and producing operations. If that tool, the helicopter, is not available daily, their operations close down. Therefore, they are spending a tremendous amount of money in developing techniques of operation, maintenance and instrument flying. In the Gulf of Mexico today, four oil companies alone fly approximately 15,000 passengers to work every month. They don't sell tickets. Their success in finding oil depends upon their tool, the helicopter, getting their workers to and from the job.

"At the moment there appear to be three distinct markets for the commercial helicopters: the airlines, using the transport helicopter; the market using the Bell and Hiller weight category helicopters in executive transport, surveys and other uses, and the third and tremendous market using cargo and transport helicopters to transport men and equipment into remote areas. We in the helicopter industry watch that third phase with as much keenness as we do the other two."

John Wiley: "It is an excellent point and I think it might be summarized by saying that it is the experience of all of us around this table today that the helicopter is not only a convenience to the conduct of modern American business, but it has become a necessary tool in the conduct of modern American business.

"Gentlemen, I see our time has pretty well run out. In behalf of SKYWAYS, I would like to thank you for attending this discussion."

Hi-Intensity

(*Continued from page* 12)

is once every three seconds, serving primarily as an attention-getter and tracking aid. Thus, a change of course from going-away to across the nose, or even a reversal of course to head-on, is immediately recognized by the observing pilot.

Of interest in the data worked up by Atkins is the statement that for aircraft of similar speeds, 40° is the angle of "constant bearing," recognized by all experienced pilots as meaning *a collision is imminent.* This angle, of course, varies for aircraft of differing airspeeds. For the pilot, it is most important to recognize early that a light or spot that occupies the same relative position on his windshield for any length of time is an aircraft on a collision course.

Ground radar controllers regularly make use of this constant bearing angle to effect military interception of aircraft, or in civil ATC radar to warn pilots of possible conflicting traffic. If a radar controller advises you of an unidentified blip on a "constant bearing" to yours, don't wait for him to suggest a course of action, ask for a vector!

The Atkins Relative Danger Light consists of three Zenon hi-intensity condenser-discharge bulbs mounted in a 5″ by 10″ by 11″ tear-drop housing that projects about six inches above the fuselage and weighs about five pounds. The three bulbs are shielded so that they flash in the desired relative danger zones at the frequencies previously noted. Operating on 115 volt 400 cycle AC current, they consume about 80 watts.

Actually, the three bulbs could be mounted separately—in the nose, atop the fuselage, or in the tail—and achieve the same effect. In a test to determine the versatility of the device, one was operated successfully from an electric-shaver type outlet and another from a small pack of dry cells. The duration of flash is in the order of 1/1000th of a second or 1/10th that of a photoflash or revolving beacon. Dark adaptation is not effected even by steady staring.

The Atkins light has been seen in snowstorm conditions twice as far as normal daylight visibility. Because of the light's highly detectable flash, even in daylight, it would seem that top and bottom installations would have prevented the UAL/AAL Convair incident at Chicago where the two aircraft met in vertical convergence in a mutual blind spot. Such a reflection on skin surfaces of an aircraft would be an unmistakable warning to a pilot letting down onto or climbing up into another aircraft so equipped.

The light has no moving parts to wear out, the timing is electronic on printed circuits and lost efficiency shows up in a noticeable gradual dimming rather than a sudden, unexpected burn-out.

Until someone turns up with something better, the Madsen and Atkins lights are two of the most positive and hopeful developments offered so far to ease the mounting airborne collision threat.

There remains, however, one field of development still facing the airborne lighting industry, that of prompt and sure identification for traffic control purposes. Given any high-density terminal area at night in either CAVU or marginal visibility conditions, the problem of locating, identifying and following any designated aircraft among a half-dozen or more maneuvering around a busy airport defies description.

In this instance, although the previously mentioned directional and relative danger light systems enable the pilot to locate quickly and determine direction of movement of other aircraft, they often help him not at all in determining which, of several closely bunched aircraft, is the aircraft he should follow in accordance with traffic control assigned sequence. Night ranging depth perception, with both the viewing platform and the observed object in motion, is such that pilots today still pick up and follow the wrong aircraft in sequence. This sometimes results in the highly dangerous cut-off of preceding traffic thought to be entirely out of the approach line-up.

Possibly some system of color coding associated with the newer light systems or some other solution will be found to resolve the dilemma of just too many aircraft, however well lighted, maneuvering near a busy terminal.

Heliport Planning

(*Continued from page* 17)

passenger operation from the proposed rooftop heliport is feasible or safe due to operational consideration, either with the use of pneumatic flotation gear or with the standard S-55 wheel landing gear with currently available emergency flotation equipment."

The Port Authority's first big step toward planning heliport facilities for the New Jersey-New York metropolitan area was taken in August 1951, when we authorized a comprehensive study by a group of consultants to determine, within the limits of knowledge then available, future helicopter traffic volumes, the probable pattern of helicopter services in the area, and the requirements for helicopter landing areas. The results of this study were published in November 1952 under the title of "Transportation by Helicopter 1955-1975."

Shortly after the publication of this report, we initiated a staff study to expand and update the heliport section of the report in order to develop a long-range plan for heliport construction in this area. Current and future helicopter design and performance were reviewed with helicopter manufacturers and airline operators, and the desire of helicopter designers for operating areas was balanced against the practical requirements of locating heliports in built-up urban areas.

This second study, entitled "Heliport Location and Design," was published late in 1955. Although it was developed for application to the New Jersey-New York area, the conclusions have general applicability to principal heliports. It is meant to apply generally to operating areas for helicopters of a size which will accommodate upwards of 20 passengers. It is not meant to apply to what might be termed "local stops" in suburban areas.

(*Continued on page* 42)

Fuels—Oils

(*Continued from page 22*)

but cannot return to the bureau's 2,000-gallon "home" tank at Floyd Bennett Field.

Private operators, of course, would have to take into consideration local regulations regarding storage of fuel, but the placement of a few emergency cans along, say, an industrial helicopter flight circuit—a pipeline, the course between a group of plants, etc.—might pay big dividends in occasional convenience. Tanks should not, however, be "let set" too long as the gasoline may go stale and the lead concentration may increase, as mentioned earlier.

Storage of fuel, of course, leads to thoughts of what the future may hold as helicopters more and more invade highly built up areas for their bases of operation. Will there, for instance, be problems when downtown rooftops become true heliports?

The reassuring answer is obvious. Downtown storage of equivalent fuels, like high-octane motor fuel and even commercial stores of kerosene, have long been welcome "downtown." Gasoline storage tanks are commonplace in major hotels and downtown parking buildings.

Pits, pumps, tanks? There again there are reassuring answers. Helicopters are being fuel in every imaginable way.

In the jungles of Latin America where helicopters have been the real life-line of oil explorations, 55 gallon drums, fitted with pump and hose, serve admirably.

Many operators use truck filling without any problems and with, indeed, some extra ease inasmuch as the helicopter can generally be counted on to park itself most conveniently for the truck.

In Chicago, HAS helicopter operations are contemplating permanent pump and pit installations.

When it comes to lubrication, the helicopter does offer the problem of its many bearing units. But, even so, a half hour to an hour seems to be sufficient for normal lube operations. If there is a fairly common hope in the lube field, among helicopter operators, it is that the need for two sets of grease guns may soon be eliminated when makers begin specifying a wide range grease rather than a general grade and a high temperature grade as at present.

In models having linkage rather than booster control systems, graphite lubrication may take some extra time.

SUMMARY: Low lead content or the use of TCP are the approaches being followed to meet the plug fouling challenge of the high output power plants used in helicopters. Power settings up in the 80% class mean high lead sensitivity in most of these engines. Success has been achieved by blending fuels to cut down lead content at a greater ratio than the reduction of octane value. Lower octane and lower lead content also has proved an answer. Use of TCP in a wide range of fuels is the additive answer.

British Petroleum Co. Refinery May Change Import Picture

At present Great Britain is highly dependent upon imports from the United States to take care of its demands for avgas. Within two years, however, there may be a substantial change in that situation, according to plans already underway just 40 miles southeast of London.

There, the British Petroleum Co. is installing a plant to refine some 2,600 barrels-a-day of aviation gasoline. The exact site is on the Isle of Grain where the company already operates its Kent refinery.

Cost of the new plant is estimated at $18,200,000.

Bendix Offers Fuel Flow Meter For Light Twins

An illustrated brochure on the new Bendix Low Range Fuel Flow Meter is offered by the Airwork Corporation of Millville, N.J. This flow meter has been designed for light twin-engined aircraft, and provides the same economy and accuracy as the high range systems used by the airlines. The operating range is from 55'c to 70'c; accuracy is 1% of full scale value.

The system can be easily installed by any competent fixed base operator. It reduces fuel consumption, reduces maintenance due to too-lean mixtures and provides a wider operating range. (Note: Airwork is giving a free fuel flow calculator to pilots who order the meter within the next 30 days. A dual installation costs approximately $928.00.)

SKYWAYS presents, NU-AVI-QUIP.

For too long, ground and airborne equipment for non-subsidized commercial aviation represented by business aircraft, base operators and other service organizations has had a "hand me down" quality as a result of the advantages to a manufacturer of large airline bulk orders.

Unlike the automotive replacement parts field, the aviation industry is only beginning to meet the need for new and replacement equipment especially suited to the growing business and utility aviation field. To bring this market into focus, NU-AVI-QUIP will report and sometimes editorialize on new products, services and developments for pilots, operators and service organizations. We hope our readers will bring to our attention problems and deficiencies in current equipment. The finding of solutions for these problems might be encouraged following their publication in NU-AVI-QUIP.—Editor.

Step-Door Conversion For Twin Beech

The Ohio Aviation Company, Dayton Municipal Airport, Vandalia, Ohio, offers a combined step door that can be quickly installed on any Twin Beech within four days, or little more than normal periodic check time.

The added safety and convenience over the standard swing-back door and loose portable steps are obvious. Executive pilots who must "double in brass" as cabin attendant will especially appreciate the efficient safety aspect of not having well-meaning company execs bailing in and out with the cumbersome and unsteady step-stool, or leaving it behind. Easily closed, the door shuts tightly with a heavy duty lock and separate safety catch. Internal trim is leather.

Ohio also offers a handy, retractable table for Twin Beech or Lodestar. Open, the usable surface measures 28 by 18 inches. Closed, it extends only 4½ inches from the side of the cabin wall to which it is mounted. Weight 12 lbs.

"Safeather" Tells Pilot When To Feather

Ever since the introduction of the feathering propeller, pilots have been plagued by the fact that the "cure is often worse than the disease." In the tense confusion of the moment, especially on takeoff, when an engine quits or loses power, the pilot must not only identify the failing engine instantly but evaluate the degree of the power loss, and decide for or against feathering while struggling to maintain control and airspeed. Auto-feathering offsets its advantages of swift, selective action with the penalty of complete loss of thrust from an engine quite possibly capable of delivering sufficient power to save a bad situation.

SAFEATHER operates only when the operation of the engine involved makes the transition from thrust to drag. It is engineered from the simple principle of torque application. The feathering control button itself is the signal and indicates *when* to feather *which* engine.

By means of a torque sensing unit mounted on the engine mount, the twisting strain of a power-developing engine is measured and when that strain is relieved or applied in reverse, as in the case of a windmilling prop, the fact is transmitted to the indicating control button in the cockpit. Obviously, the less critical situation of a partial power failure, or a momentary power loss would be indicated by negative inference and the pilot could make his operational decision based on that information.

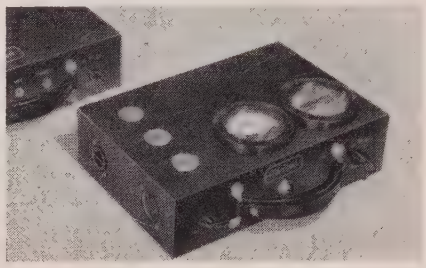
SAFEATHER is designed for any size multi-engine aircraft from the light twins on up. It is manufactured by Allied Instrument Mfg. Corp. of Houston, Texas.

Instrument Power Supply For Field Service

A portable 400 cycle power supply designed for field use in testing and servicing aircraft instrument systems, and small enough to carry in a brief case, has been announced by Avien, Inc., Woodside, N.Y. It weighs less than 7 lbs, measures 12"x8"x3½". Rubber stand-offs make it convertible to bench service.

Operating from any 115 volt 60 cycle line, it features continuously variable output from 90 to 125 volts. A 3-position switch selects output frequencies of 360, 400 and 440 cycles, with vernier control for fine frequency adjustments. Stable output of 10 VA accommodates most instrument systems encountered in field service.

The supply is available either with built-in voltage and frequency meters, or with receptacles for connecting external meters.

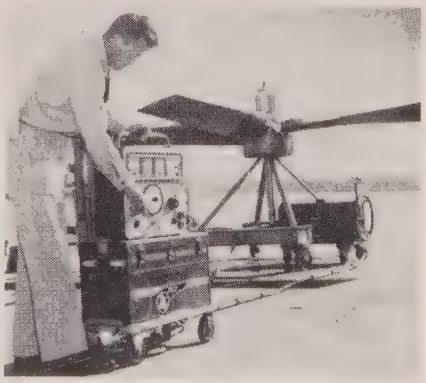


Propeller Inspection By X-Ray

Aircraft service organizations and fleet operators will be interested in a PAA propeller inspection program.

Every blade is inspected before going into service. The garter area is X-rayed at each 1400 hours and the complete blade at each 2800 hours. The Andrex portable X-ray equipment is so light that it can be transported in car or plane, and operates off any 110V or 220V supply without special transformers. Used also by PAA for inspections of radiators, bank manifold harnesses, cylinders, landing gear cylinders and fuselage structures.

Available from Holger-Andreason, Inc., San Francisco, Cal.



Heliport Planning

(*Continued from page 39*)

It is evident from our studies that heliport size must be limited if the helicopter is to operate successfully from the center of cities. Thus it is desirable that heliport standards be developed within the industry and that commercial helicopters be designed to operate from heliports of reasonable size. The study was therefore made public to encourage the consolidation of views on heliport design.

One of the things we discovered as a result of our studies must be mentioned as a starting point and basic assumption. That is the surprising fact that the versatile helicopter loses much of its versatility when it becomes a commercial common carrier. This is surprising because the helicopter is best known so far for its dramatic military missions and its superb performances under such circumstances as the recent floods in New England and Pennsylvania. We all know that it can ascend and descend vertically, hover, fly sideways, or back up. Thus it was natural to assume that the helicopter can perform these same maneuvers in regular commercial operations, making heliport site selection and construction a rather simple process.

In actual fact, these manuevers are not practical when the helicopter is to be used in scheduled commercial operations where its success will depend on its ability to carry large loads safely. In commercial operations the helicopter will be forced, for reasons of safety and economics, to use relatively flat approaches and take-off angles, to avoid hovering, and to use forward flight only.

Thus commercial heliport design is infinitely more complex than is generally believed. Careful site selection and proper attention to approach zone clearance will be essential if the heliport is to be operated safely and efficiently.

As a summary, it can be said that the following factors must be considered in the selection of commercial heliport sites:

1. Proximity to traffic generating centers.
2. Vehicular accessibility and availability of public transportation.
3. Proximity to post office facilities. Since mail pay will be of major importance to the economic success of the helicopter in the initial stages, the importance of this factor is apparent.
4. A site with sufficient size and proper elevation. Elevation ranging from ground level to that of a relatively low building seems preferable. The space needed for the landing area combined with the necessary parking facilities will require an area of a size that may often prove difficult to assemble in downtown sections.
5. The location must be one that will allow helicopters to operate in conjunction with other helicopter traffic in the area without detrimental effect on fixed-wing traffic.
6. Existing obstruction clearance and possibility of obtaining permanent approach protection by zoning or through natural means.
7. The approach area should permit emergency landings in case of engine failure without serious injury to helicopter occupants or property owners. This requirement may later be eliminated by im-

provement in one-engine-out performance.

8. Economics of site development.

9. Practicability of providing refueling facilities. Bulk storage will be necessary and delivery by barge should be considered, where possible, to reduce costs.

Our conclusions on the size of heliports can be summed up by saying that a major heliport today requires a landing and take-off area 100 by 100 feet if located at or near ground level where the "ground cushion" safety factor of flight below 10 to 15 feet can be utilized. If the heliport is elevated, the size must be increased to allow a take-off run long enough for safety. By 1960, the landing and take-off area will probably have to be about 200 by 400 feet.

Concurrent with the heliport study we set out to develop an over-all regional program for helicopter landing areas. It was indicated by our studies that the area on the Hudson River at the foot of West 30th Street was the logical point from which we should start our plan. In light of the fact that we feel experience should be gained from operational, weather and traffic data, we proposed the development of an initial heliport on the bulkhead site at 30th Street.

After an 18-month delay, the Port Authority made its request public in August 1955. This public demand for a heliport permit was denied by the Commissioner of Marine and Aviation of the City of New York and the present stalemate developed.

The Civil Aeronautics Administration had, on March 8, 1954, informed New York Airways, Inc., the certificated helicopter carrier serving this area, that it would approve helicopter operations to and from the Port Authority-proposed heliport site.

Further corroboration of the Port Authority's position was made public when we released statements by the world's leading helicopter experts, who agreed that a temporary $50,000 heliport on the bulkhead at the foot of West 30th Street would properly and safely accomodate commercial helicopter traffic. The experts who supported the Port Authority's position included I. I. Sikorsky, engineering manager, Sikorsky Aircraft, Division of United Aircraft Corporation; Harry S. Pack, vice president, Piasecki Helicopter Corporation; Harvey Gaylord, vice president, Bell Aircraft Corporation, Texas Division; Colonel William B. Bunker, president, The American Helicopter Society, Inc. and commandant of the Army Transportation School at Fort Eustis, Virginia, and A. V. J. Vernieuwe, vice president—operations, Sabena Belgian World Airlines.

The need for this facility is indicated by figures which show that if the 30th Street heliport had been built when the Port Authority first submitted its plans early in 1954, it already would be accommodating hundreds of passengers everyday between Manhattan and the regional airports. By 1960, almost 2,000 passengers a day will require the services of the heliport on the west side of Manhattan. By that time we would probably have sufficient operational experience and wind data to proceed with detailed plans for a permanent heliport on the site. It would cost about $5,000,000 and would eventually be only one part of an integrated system of heliports serving the area.

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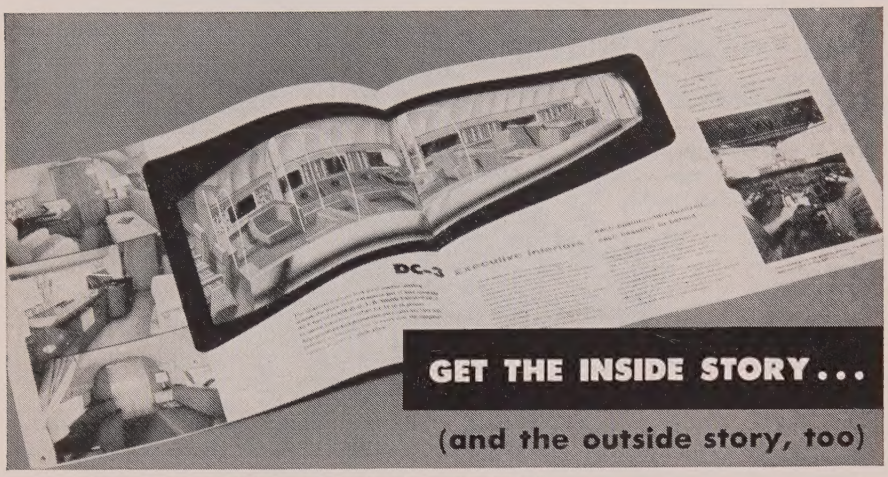

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We understand at least two planes flew over the refinery about that time—a Constellation and apparently a DC-3.

If you have such pictures or know where we can find them, please write us. Or, if you don't have pictures but were flying close enough to the area *at or before that time* to describe in detail the appearance or spread of the fire, we would appreciate talking with you.

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Now Hear This

(*Continued from page* 8)

GM's Allison Division.

Ted Nolan, Bell Aircraft's manager of experimental manufacturing since 1950, has been named manager of product planning. **Glenn Lord** has been appointed Bell's manager of systems and methods.

Maj. Gen. Gerald J. Higgins, U.S.A., (Ret.), was recently elected a director of Piasecki Aircraft Corp.

Roy Thorson, former sales representative for Camair, division of Cameron Iron Works, has been named sales manager.

Emmet E. Baker, Jr., formerly with Bendix Aviation Corp., has joined Chamberlain Aviation, Inc., as manager of its Electronics Division.

Dean Randall has been promoted to advertising manager for Minneapolis-Honeywell Regulator Co.'s Minneapolis divisions.

Thomas P. Lombardo, formerly with Dallas Aero Service, has been named president and general manager of Aero Corp. of Atlanta, Ga.

Harrison W. Holzapfel has joined the engineering staff of Garrett Corp.'s AiResearch division at Los Angeles.

James Gannon has been appointed by Weber Aircraft Corp. as assistant chief sales engineer.

Temple Joyce and **Carl H. Dolan** recently were elected to the board of directors of Nagler Helicopter Co., White Plains, N. Y.

Ralph S. Euler and **Walter W. Candy, Jr.,** were elected to American Airlines' board of directors.

Albert A. Budde has been named sales manager of the components division of Fairchild Controls Corp.

Ralph W. Nesmith, Jr., and **Jack L. Browning** have been named assistant sales manager and sales representative respectively by Camair, division of Cameron Iron Works.

Raymond Higgins has been appointed manager of Sun Oil Co.'s new aviation department.

COMPANIES

Hamilton Standard, division of United Aircraft Corp., has purchased the Aero Pneumatics division of Pacific Airmotive Corp.

Norden-Ketay Corp. has contracted to acquire Gyromechanisms, Inc., of Halesite, Long Island, N. Y.

Curtiss-Wright Corp. recently acquired Turbomotor Associates. To be known as the Turbomotor division of Curtiss-Wright, the new organization will develop engines in the low to medium power categories for aircraft, helicopters, missiles and drone applications.

American Helicopter Division of Fairchild Engine and Airplane Corp. has been renamed Fairchild Electrotechnics Division.

HONORS

H. Julian Allen of NACA received the 1955 Sylvanus Albert Reed Award from the Institute of Aeronautical Sciences. **Capt. Wilbur E. Kellum, USN,** of the Naval Medical Research Institute was presented the John Jeffries Award for 1955 by I.A.S. **Giles J. Strickroth** of Glen L. Martin Co. received the Lawrence Sperry Award for 1955 and **Lt. Col. Robert C. Bundgaard, USAF,** received the Robert M. Losey Award for 1955 from I.A.S.

Mrs. Carlton Conrad, a former president of the Cleveland Women's Chapter of the National Aeronautic Assn., has been honored by N.A.A. with a plaque and life membership.

Howard S. Cullman, honorary chairman of the board of commissioners of the Port of N. Y. Authority, received the 1956 Stevens Honor Award from Stevens Institute of Technology.

AERO CALENDAR

Mar. 6-8—Fourth annual Air Safety Forum, Air Line Pilot Assn., Shoreland Hotel, Chicago, Ill.

Mar. 19-22—National convention, Institute of Radio Engineers, Kingsbridge Armory & Waldorf-Astoria Hotel, New York.

Apr. 9-12—Society of Automotive Engineers, national aeronautic meeting, aircraft engineering display and aeronautic production forum, Hotel Statler, New York.

Apr. 22-26—Twenty-ninth annual convention, American Assn. of Airport Executives, Hotel Carter, Cleveland, Ohio.

May 2-5—American Helicopter Society, 12th annual national forum, Sheraton-Park Hotel, Wash., D. C.

Off-Shore Oil

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far from where he lived. The "roughneck" rushed to the appointed open spot on the sandy beach, and by the time he walked to the nearest level area the Seahawk was hovering over it for a landing. With the help of the helicopter he still made it to the rig in time to take his place on the early morning shift.

A part of the Glasscock organization's contract with the oil company which leases the $3½ million drilling rig is to furnish the operating crew and supply transportation for oil company personnel working with the drilling contractor. Hence the helicopter contract is with the Glasscock organization.

The contract is based on a monthly fee calling for 60 flying hours. If the time flown is actually less than 60 hours, Glasscock pays on the basis of 60 hours anyway. If the time runs over 60 hours, payment is based on a flat rate for the first 60 hours and a specified hourly rate above that minimum. Flying time seldom drops below the minimum, Pilot Chatterton says, but usually runs between 80 and 100 hours per month.

The main job for the helicopter is to transport crewmen from shore to the rig and haul back the crew that has been relieved. The hauling job is heavy every eight days, for a crew remains on the drilling rig and works 12 hours a day for eight days. When relieved, the crew than goes ashore by helicopter and enjoys four days of leisure, then back again to relieve the other crew that has been on board and working.

The helicopter, after landing on the drilling rig at around seven in the morning, stands by until about seven o'clock in the evening, except on crew-changing days when it is pretty busy throughout the day. Pilot Chatterton whiles away his time in the spacious lounge of the floating drilling palace and may not make a single trip throughout the day.

Generally, however, an official of the oil company for which the drilling rig is working wants to come abroad, or a mud engineer must come out and check on the mud service incident to drilling, or an instrument specialist comes aboard to run an electrical log on the hole. Whoever it is, if he is not squeamish about riding a helicopter, he is picked up by Bill Chatterton and in minutes is deposited on the 50-foot 'copter port at the stern of the rig.

No flights, one flight, or a dozen, it's all in the day's work with the helicopter pilot serving the fabulous offshore drilling rigs, and Bill Chatterton says he never has had it so nice. He has ample time for reading, he eats most of his meals aboard the drilling barge—and there are no better meals at the Waldorf—and he has time to keep his helicopter in tip-top condition.

Because of the tremendous expense in drilling offshore wells, time is so vital that the cost of saving an hour or a day is secondary in comparison to the cost of idle time, and the 'copter does much to keep idle hours to a minimum.

The Shell No. 1 State (Tract 884), which the "Mr. Gus" is currently drilling, will cost an estimated million dollars. Much of that cost is involved in delays, improvisions and a general feeling-the-way because of the radical departure in drilling wells in the Gulf as compared to land drilling.

The flat fee of $250 an hour for use of the drilling platform and crew is only one of many factors that run the actual hourly cost of delay into many hundreds of dollars. For example, the mud engineers get a flat fee of $60 an hour. Obviously, any delay while a mud engineer is aboard, awaiting the signal for his work, runs into real money. The electrical loggers cost even more.

Hence the helicopter that can deliver emergency parts and men aboard in a matter of minutes instead of the one to four hours required by boat more than pays its keep in several ways.

"The helicopter has become an accepted essential in reducing the cost of producing oil miles from shore," declares Sherman Kennedy, manager of Hawk Helicopters, Inc. "We see it as just as essential a tool as any other accepted service in the production of marine oil."

In the meantime, Pilot Bill Chatterton says he "never had it so good." When he tires of reading and keeping his "Seahawk" spic and span, there is fishing. He eases down a tiny rope ladder to a small unloading platform suspended about 10 feet above water and fishes for ling or giant king fish. He generally keeps the steward's department supplied with more fish than it can serve.

But now and then an emergency arises, such as the time, early this spring, when he was returning to shore after delivering a passenger to the drilling platform, and his motor conked out. The waves were running about 10 feet high. Chatterton set the 'copter down nevertheless and she rode out the pounding waves for 90 minutes until a Coast Guard boat rescued him and towed the 'copter to port. There was some damage to the helicopter but not to the confidence of Bill Chatterton in the utility and sturdiness of the "Seahawk." ✈

NBAA

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ADC Replies to NBAA On Identification Procedure

Because of complaints received from business aircraft operators about the "too close" interception procedures of the USAF Air Defense Command, NBAA requested ADC to clarify the methods employed. A summary of the ADC reply follows.

"The ADC has published procedures which are designed to prevent the interception of known civil aircraft. However, visual identification by interceptor aircraft is required when a flight plan cannot be correlated or identification by other methods cannot be accomplished.

"The identification pass made by our fighter interceptors against unknown aircraft is not the combat type of attack. In conducting a pass for visual identification, the interceptor approaches the unknown aircraft from the stern and 1000 ft. to the right of the intercepted aircraft's flight path. Using this method the interceptor aircraft's rockets are not aimed at the intercepted aircraft at any time and the rockets cannot be fired by the fire control system.

"In contrast, the combat attack with the automatic fire control system must be made from approximately 90 degrees to the target's flight path. The pilot performs definite pre-planned functions within the cockpit before he commences the attack. These pre-planned functions are designed to maintain the highest degree of safety and must be executed before the rockets can be fired.

"Our aircraft are prohibited from making practice attacks on civil aircraft. You may feel assured that every precaution will be taken by this command to insure adequate safeguard of all intercepted aircraft."